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PERIODICAL READING ROOM

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THE JOURNAL OF

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Volume 44 October, 1953 Number 6

CONCEPTS OF ORGANISMIC GROWTH: A CRITIQUE

FRED T. TYLER

University of California

The educational programs of American public schools have been based upon a variety of theories respecting content and methodology. At one time religious beliefs and values played a prominent rôle in determining the selection of materials and procedures. More recently, other bases have been proposed, as, for example, the social utility theory, which selects materials in terms of practical values and eliminates topics regarded as not related to adult needs.

During the past two decades greater emphasis has been assigned to the needs of the child himself, and to the facts, principles and generalizations of growth and development as curricular guides. There is every reason to believe that an accurate knowledge of growth and development provides one very real and meaningful foundation for the curriculum of both elementary and secondary schools. Psychologists and educators must, however, be concerned about the accuracy of their data and the validity of proposed implications. It is the purpose of this paper to consider some of the principles of growth which are discussed by two writers (W. C. Olson and C. V. Millard) as having educational significance, to scrutinize the supposed function of these principles, and to study their suggested educational implications.

In advocating a modified basis for instructional programs and materials, Millard suggests that the word 'growth' may eventually replace the term 'learning'. Such being the case, he argues for a clear understanding of 'growth' in order to avoid distorted generalizations and implications for classroom procedures (*8*, p. 9). He further contends that "Growth as used here may justifiably refer either to learning which is permanent and meaningful or to given biological change" (p. 10); and that "Growth in school subjects is

governed by the same laws that govern physical or mental growth" (p. 11).

Olson's writings, too, stress the importance of the principles of growth and development as guides for the curriculum, including instructional methodology: "As will be seen in later discussions of the stimulation and retardation of growth, the individual himself and the adults about him have little control over physiological time; wise nurture, therefore, in both physical care and education, makes no attempt to alter the individual's rate of growth and development" (*13*, p. 17).

A few more quotations from Olson and Millard will indicate further some of their ideas concerning the implications of data on growth and development for the organization of educational programs: "Enough is known . . . to question seriously remedial work, drill, and other teaching devices" (*8*, p. 51). "The most recent findings on growth interrelations tend to challenge much of the work now classified as studies of readiness" (*8*, p. 53). "The writer believes that the late and abrupt upswing in the growth of the testes in boys is more than coincidental with similar changes in reading" (*13*, p. 133).

Some of the concepts and implications cited above are open to serious question. The material to be discussed in this paper includes: (a) The concept of the 'growth age' and the 'organismic age'; (b) Patterns of growth; (c) Physical growth and reading readiness; (d) The cyclical nature of physical growth and educational progress; (e) Familial resemblances; (f) Displacement, convergence and perturbations.

THE CONCEPTS OF GROWTH AGE AND ORGANISMIC AGE

1) The concept of the 'growth age' as the unit for measuring 'growth' in both structures and functions has been developed most extensively by Willard Olson. He explains that the principle involved in the determination of growth ages is the same as that which has been employed in the preparation of mental age scales. He further states, "that the age unit method translates unequal units of the original measure into equal units of age" (*11*, p. 3).

This is a rather unusual assertion. In the psychological literature

on mental measurement mental age units are not usually considered to be equal. Richardson, for example, observes that the mental "... age scale meets not one of the three requirements set up (for a measuring device); it has no real origin of measurement; its units are not equal, and it does not isolate a single, unitary variable for measurement" (*14*, p. 26).

Terman, the foremost exponent of the mental age unit for measuring intelligence, has never claimed that the units are equal (*16*). Similarly, McNemar has pointed out: "Not only have no claims been made for the equality of mental age units but actually their inequality has been admitted (see pages 24–29 of *Measuring Intelligence*). In fact, the use of IQ units is predicated on inequality of mental age units" (*10*, p. 153). Recognition of the inequality of these units does not mean that age scales are without value, but it does place certain limitations upon their use.

These remarks about mental age units surely apply to other age units which are based on the same conceptions and derived in a similar manner. On theoretical grounds, there seems little justification for believing that the difference between Reading Ages (RA's) of nine and eight years represents the same psychological difference, i.e., difference in achievement, as that between RA's of thirteen and twelve years, or the same structural difference as that between Height Ages (HA's) of thirteen and twelve years.

2) Olson believes that changing growth data into growth ages enables one to "refer such diverse things, for example, as height in inches, weight in pounds, number of teeth erupted and strength of grip in kilograms to a common growth age scale and speak of height ages, weight ages, dental ages, and grip ages" (*11*, p. 2). In another publication he states that, "The unconventional liberty taken in averaging diverse data is based on the hypothesis that all are samples of structures and functions of the organism, and that different individuals may be organismically equal while having different patterns" (*1*, p. 202). The average referred to in this quotation is designated by Olson as the Organismic Age (OA).

The use of growth ages to determine the OA will be illustrated by an example from the manual prepared by Olson and Hughes (*11*, p. 14, Exercise 3). The following data for a twelve-year-old boy

were obtained from their tables:

Characteristic	Absolute Measure	Growth Age in Months
Height	58.7 inches	152
Weight	106.0 pounds	176
Dentition	17 teeth	127
Intelligence		136
Education		140
Sum of ages		731
Mean of ages		146

The arithmetic mean of the five ages, 146 months, is this boy's organismic age.

It is a cardinal principle of measurement that the units of various scales must be equal if the results of measurement are to be added, as is done in computing the OA. As has been suggested, there is some doubt that growth age units are equal. An age scale may provide useful data for portraying a specific aspect of growth, but it is doubtful if data from a series of age scales can be appropriately used to make a direct comparison of several types of 'growth' in a given child, or to compute such statistics as the OA.

Despite Olson's assertion to the contrary, one must also ask about the psychological meaning of an average computed from several different measures of an individual, even when they are all obtained from a single type of measuring instrument, such as a linear scale. Consider the following data for two subjects in the Adolescent Study at the Institute of Child Welfare, University of California:[1]

Subject	Growth Age in Years		Mean Growth Age
	Height age	Biacromial age	
A	12.5	10.5	11.5
B	11.2	12.0	11.6

Here are two boys with very similar mean growth ages. In what meaningful sense can it be claimed that they are 'organismically equal'? Knowing that each has a mean growth age of about 11.5 years gives no useful clue about their comparative status in height

[1] Growth ages are based on norms from this particular study.

and shoulder width, the characteristics contributing to this age. Surely one may question the significance or utility of an average based upon these measures.

It seems even more difficult to interpret the arithmetic mean of a series of ages, some of which are measures of size and some of other aspects of structural development, such as, dentition and ossification. Finally, is the OA really a useful concept when it is the mean of a series of ages representing status in height, strength of grip, basal metabolism and spelling achievement—measures of both structure and function?

What is the educational or clinical value of knowing the organismic age of the following Adolescent Study boys?

Subject	Wt. (Kg.)	Wt. Age	Ht. (mm.)	Ht. Age	MA	IQ	CA	OA
D	347	10.8	1509	12.4	12.3	102	12.1	11.8
E	391	12.0	1476	11.8	11.7	105	11.1	11.8
F	338	10.5	1480	12.0	13.1	114	11.5	11.9

D is a relatively tall, slender adolescent. E, one year younger, is shorter but heavier. Based on weight age, height age and MA, their organismic ages are the same.

F is somewhat brighter than E but is considerably lighter. They differ in both MA and WA. Despite the comparability of the OA's, these boys may be expected to have different kinds of problems in their adjustment to school and to their peers. Knowledge that they are organismically equal (that is, have equal OA's) seems less valuable than the knowledge of their specific status in height, weight and intellect.

PATTERNS OF GROWTH

Olson states, "Whole classes and school systems have been shown to have distinctive patterns depending upon selective factors. Thus, children selected for mental deficiency tend to have a low MA curve and to regress toward the average on other factors. Children selected for intellectual giftedness tend to have a high MA line and to regress toward the mean on other factors" (*13*, p. 182). Two points should be noted about the interpretations included in this quotation. It is not surprising to find that a group of children selected for intellectual deficiency regress toward the mean of unselected children on other measures of 'growth'. Neither is it sur-

prising to find that children selected for 'intellectual giftedness' tend to have a high MA line. 'Intellectual giftedness' is defined by a superior mental age. The regressions and tendencies which attract Olson's attention are statistical artifacts. They cannot be used as evidence of some underlying principle of 'growth', nor as evidence for distinctive types of individuals.

Millard states that "... It is impossible to differentiate one growth pattern from another when several are reduced to growth ages and graphed together. Stated in another way a reading curve and a height curve for the same child are usually strikingly similar" (*8*, p. 22). A consideration of the growth curves, and the data for such curves, presented by Olson and Hughes in their *Manual* (*11*) warrants some suspicion concerning the validity of this conclusion.

The data for the child presented in Figure 1 of this Manual (*11*) were used to test the hypothesis that it is impossible to differentiate one growth pattern from another when they are both expressed in age units. On the assumption that growth curves (in age units) are linear, the equations for the curves of Educational Age (EA) and Dental Age (DA) were computed. If the growth curves of different growth phenomena are 'strikingly' similar, then the equations should reveal this in the similarity of their slopes and intercepts. The slopes and the intercepts of these equations are not identical, as may be seen from the equations (1) and (2) below. The values of the DA's were read from Figure 1; the EA's were taken from the table on page 7 (*11*). Letting y be the dependent variables (EA and DA) and x the independent variable (chronological age—CA) the equations for the curves showing age changes for EA and DA, respectively, were computed by the writer and found to be:

$$(1) \quad y = 1.879x - 64.814$$

and

$$(2) \quad y = .776\,x + 23.036$$

If the curves are such that is is not possible to differentiate one type of growth from another, then it should be possible to use either equation to predict EA or DA. Using the two equations in turn, the predicted EA's at 122 months are about 164 and 118 months, a difference in predicted value of nearly four years; measured EA was reported to be 174 months. DA, then, is an unsatisfactory predictor of EA. The presence of poor predictions cannot be ignored

when a generalization is being attempted; exceptions as well as agreements must be considered.

In conclusion, it seems that more evidence must be forthcoming before the term 'growth' can be applied to both structural and functional changes as is proposed by Millard: "Growth as used here may justifiably refer either to learning which is permanent and meaningful or to given biological change" (*8*, p. 10).

MENTAL AND PHYSICAL QUOTIENTS

Olson and Hughes suggested the Organismic Quotient (OQ) as a measure of rate of organismic growth (*12*). They defined the OQ as the ratio of organismic age to chronological age; thus it is comparable to the Intelligence Quotient (MA/CA). In their paper, they presented the OQ's for a child at ages five through eleven, these being, 101, 102, 98, 99, 98, 102, and 106. The greatest difference is eight OQ points between ages seven or nine and eleven years of age. Olson commented on the stability represented by the OQ. These quotients may indicate that the OQ is very stable, more so than is the IQ. However, studies comparable to those reported by Honzik, Macfarlane and Allen (*6*), and by Bayley (*3*) would be necessary before such a generalization should be proposed. Furthermore, greater stability should be found since the OQ, being a mean of several ages, can be expected on statistical grounds to be more stable than the IQ.

Millard was interested in the possibility of predicting IQ's from measures of height maturity (*7*). Using the Courtis method of determining the equation expressing the relationship between age and measures of growth, he predicted the IQ's of twenty-five boys from a knowledge of their height maturity. The correlation between predicted IQ's and measured IQ's was .83 with a standard error of .05, a figure which is certainly comparable to the correlations between IQ's obtained from different intelligence tests.

The result reported by Millard will be surprising to psychologists familiar with correlations between mental and physical characteristics. Jones (*4*, p. 601), commenting on a study dealing with physical-mental relationships by Honzik and Jones (*5*), wrote: "Correlations close to zero were found at each age from twenty-one months to seven years, but the uniformly positive coefficients for both boys and girls suggested the presence of a genuine, even if meager, relationship; there was, moreover, a slight tendency for

growth rates in height or weight to be correlated with increments in mental scores." Both Olson and Millard are aware of this material, but their postulates imply a much higher degree of relationship (*8*, p. 169, and *13*, p. 31).

It must be admitted that there is little direct evidence on the particular relationship discussed by Millard; namely, that between height maturity and educational maturity. However, a partial explanation may be found in his paper: "Knowing only the mean IQ of the group, the problem became one of predicting individual IQ's from the height measures which covered a three-year period of measurement" (*7*, p. 446). How accurately could the IQ be predicted from 'height measures' if the investigator did not know the mean IQ of the group for whom the predictions were to be made? It appears that in order to make predictions of this degree of accuracy it may first be necessary to obtain the IQ's of the subjects from a general intelligence test, unless, of course, the investigator knows that he is dealing with some specific sample, such as, an average group. Further studies involving larger samplings should be used to investigate this problem. Probably the really important point in this connection is the inference that all growth patterns are closely interrelated.

PHYSICAL MATURITY AND READING READINESS

Millard points out that present attempts to use a child's growth status to estimate reading readiness are unsatisfactory because of the nature of the measures employed to determine maturity. Educational practices could be placed more in the realm of an exact science, he believes, if certain types of relationships were to be discovered between physical and educational 'growth' (*8*, pp. 43–44). For instance, it would be possible to use height to estimate the time to initiate reading instruction if there were a suitable mathematical relationship between 'growth' in height and reading. According to Millard, evidence for such a relationship is available.

From graphs showing height and progress in reading he states: "For example, in the three cases, each child acquires a height maturity of sixty-five to seventy-two per cent before reading begins" (*8*, p. 42); hence instruction in reading should not be initiated until the child has reached about two-thirds of his mature height. The meaning and significance of this observation will be considered.

1) Millard presents three sets of graphs for each of the three cases. In Figure 1 (a), CA was plotted against reading age; in (b), the data on reading age were smoothed before being plotted; in (c), CA was plotted against "percentage of development". Note that in (a), the lowest age at which the reading age was plotted was about ninty-five months. In the process of 'smoothing' the lowest age became eighty-two months. Finally, in (c), the youngest age shown on the graph is sixty-seven months. Apparently this change from ninty-five months to sixty-seven months was produced by extra polating beyond the data obtained by measurement.

It is legitimate to ask how much reliance should be given to such an estimate of the age of 'beginning reading'. In this particular instance, sixty-seven months may be a reasonable estimate of zero ability in reading as measured by a reading test, but one suspects that this child with an IQ of 173 might well have started reading before he was sixty-seven months old, for at that time his mental age would be in the neighborhood of 116 months, almost ten years. In another illustration presented by Millard, (*8*, p. 49), the estimated age of beginning reading was about 82 months (almost seven years) for a child with an IQ of 114. We might ask about the meaning of the expression 'age of beginning reading'. Surely, in view of the complexity of the reading process, it is difficult to define this age. Is it when the child first recognizes letters as naming pictures, or is it when he reads pictures (*13*, p. 121), or is it at some still earlier point in chronological time?

If there is some error in estimating the age of 'beginning reading', then, too, there will be an error in the conclusion that "each child acquires a height maturity of sixty-five to seventy-two per cent before reading begins."

2) The computation of 'percentage of development' for height (*8*, p. 47) employs some measure of maturity in height, and of course the percentage at any given age will depend upon the base used. The maximum age for which data were shown graphically by Millard was about fourteen years. Was the 'percentage of development' in height computed by using height at age fourteen as the base? If so, it would appear that the generalization should be to the effect that the child had attained about two-thirds of his fourteen-year-old height before he began to read. This is somewhat different from the reported conclusion, for typically children have not finished growing in height, and so have not reached 'height

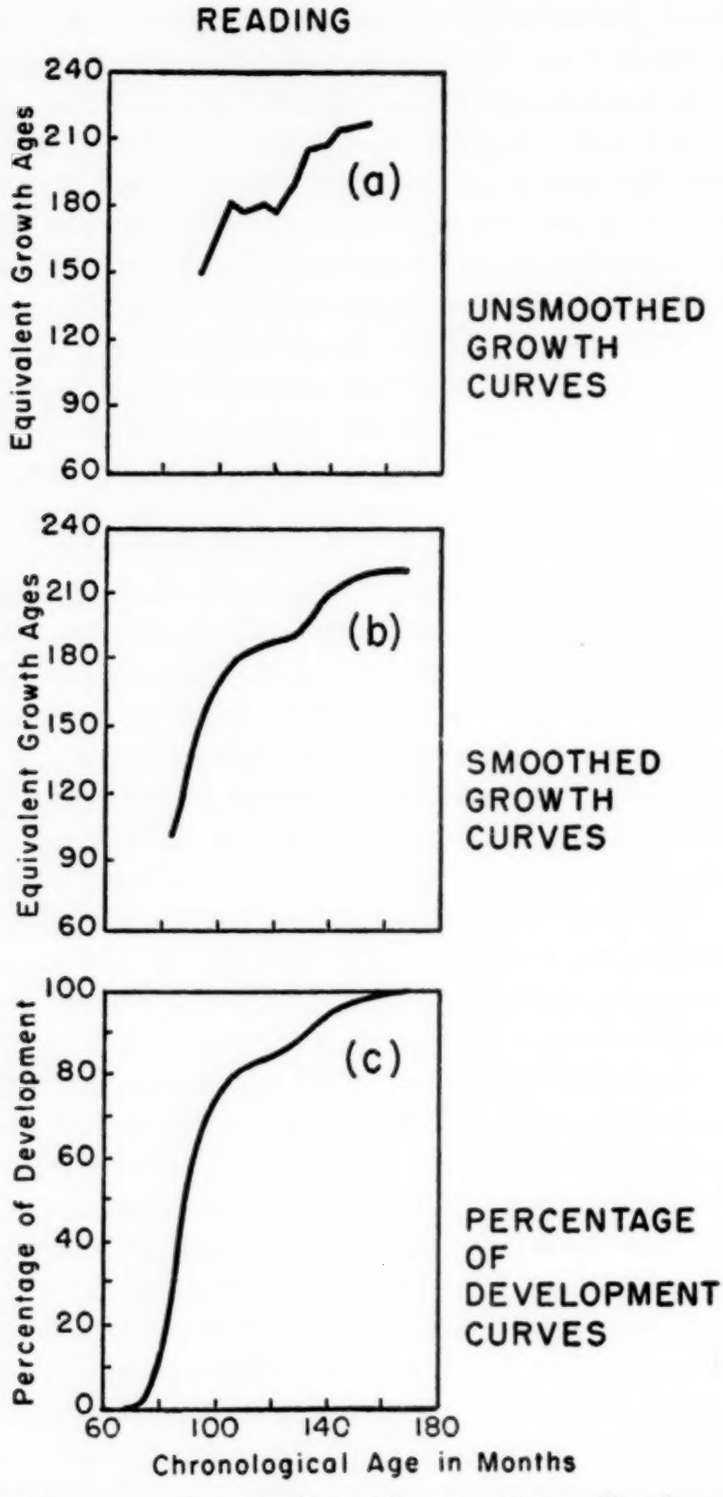

FIG. 1. Three types of curves for achievement in reading for one child—Case 63F in Millard (*8*).

maturity' at age fourteen. Moreover, at age fourteen they (especially boys) are quite heterogeneous with respect to their relative maturity.

3) Even if such a relationship were found to hold for all children in the sample from which the three cases were selected, it does not necessarily follow that reading should start when the child has attained approximately two thirds of his 'height maturity', and not until then. Such an implication would fail to take into account the fact that these children were in a specific cultural, and especially educational, environment. Possibly the relationship claimed by Millard is simply a reflection of the existing educational program. In that case the data do not provide evidence that reading instruction should be initiated when every child has reached some specific fraction of his 'height maturity'.

4) Just how useful is Millard's index of height maturity for predicting reading readiness? Such an index is not readily available to the classroom teacher, for how can he know when a child has attained about two thirds of his height maturity? With what degree of accuracy is it possible to predict percentage of 'height maturity' in the absence of knowledge of mature height? Bayley (*2*) has recently provided a more accurate technique for making such predictions, but the method requires the use of information obtained from x-ray photographs. Such data are not usually available to educational authorities.

Apart from any of the above criticisms of this concept, the writer is inclined to believe that Millard's statement would have been better phrased in the past tense: "For example, in the three cases, each child had acquired a height maturity of sixty-five to seventy-two per cent before he began to read". This might have been a statement of fact; but it does not necessarily imply that reading should be postponed until a child has attained a certain degree of 'height maturity', on the hypothesis that he will not begin to read prior to that time. Further evidence is required for such generalizations.

THE CYCLICAL NATURE OF GROWTH

Millard assumes that 'growth' curves of both physical and educational characteristics are cyclical in nature, and claims that "a child who enters puberty late should show a late adolescent spurt in all kinds of growth. A child who is precocious physically should

show early starting points in all of his learning curves" (*8*, p. 45). The educational implications of this principle were not as clearly enunciated by Millard as they were for some of the other principles under discussion. However, by inference at least, such a generalization should make it possible to predict the onset of spurts in educational progress from a knowledge of growth in physical characteristics. In this case, educational programs might well be synchronized with physical growth; the rapid growth in height at adolescence would then mean that we might also expect sharp increases in the learning of the materials of formal education. Somehow educators should be able to capitalize on such a relationship—if it really is a fact. The significance of this principle is, of course, clear for questions concerned with the interrelationships of 'growth' processes.

What is the evidence for the cyclical nature of educational 'growth'? Millard presents several growth curves for each of three children with CA plotted against 'percentage of development'. On the basis of these curves Millard postulated the principle of the cyclical nature of various kinds of 'growth'. He concluded that there were two cycles of growth between ages five and fourteen, the ages shown on his graphs. In his discussion, Millard refers to the "starting point" of "preadolescent learnings" and of "all adolescent growth." He estimates the average ages at which each of the three cases "started their preadolescent learning," and their "adolescent growth," together with a measure of "average deviation of starting points."

1) For one of the three pupils, zero percentage of development in social science was about sixty months, whereas from a previous figure showing his 'growth' it appeared that the earliest age for which any data on 'growth' in social science were available was about ninety-seven months (*8*, Figures 5 and 12, pp. 37 and 47). Apparently the beginning of 'preadolescent learning' was obtained by extra polation. The validity of this estimate is surely open to question when it is obtained by such means. The same criticism applies to the use of an estimated age of maturity, since it was used in computing the 'percentage of development' and since it was apparently obtained by extra polation.

2) The present writer finds some difficulty in determining by inspection the location of the 'starting points of adolescent growth' in the graphs presented by Millard. The presence of a spurt is in doubt in nine of fifteen curves showing 'growth' in educational

MENTAL READING SOCIAL SCIENCE LANGUAGE ARITHMETIC

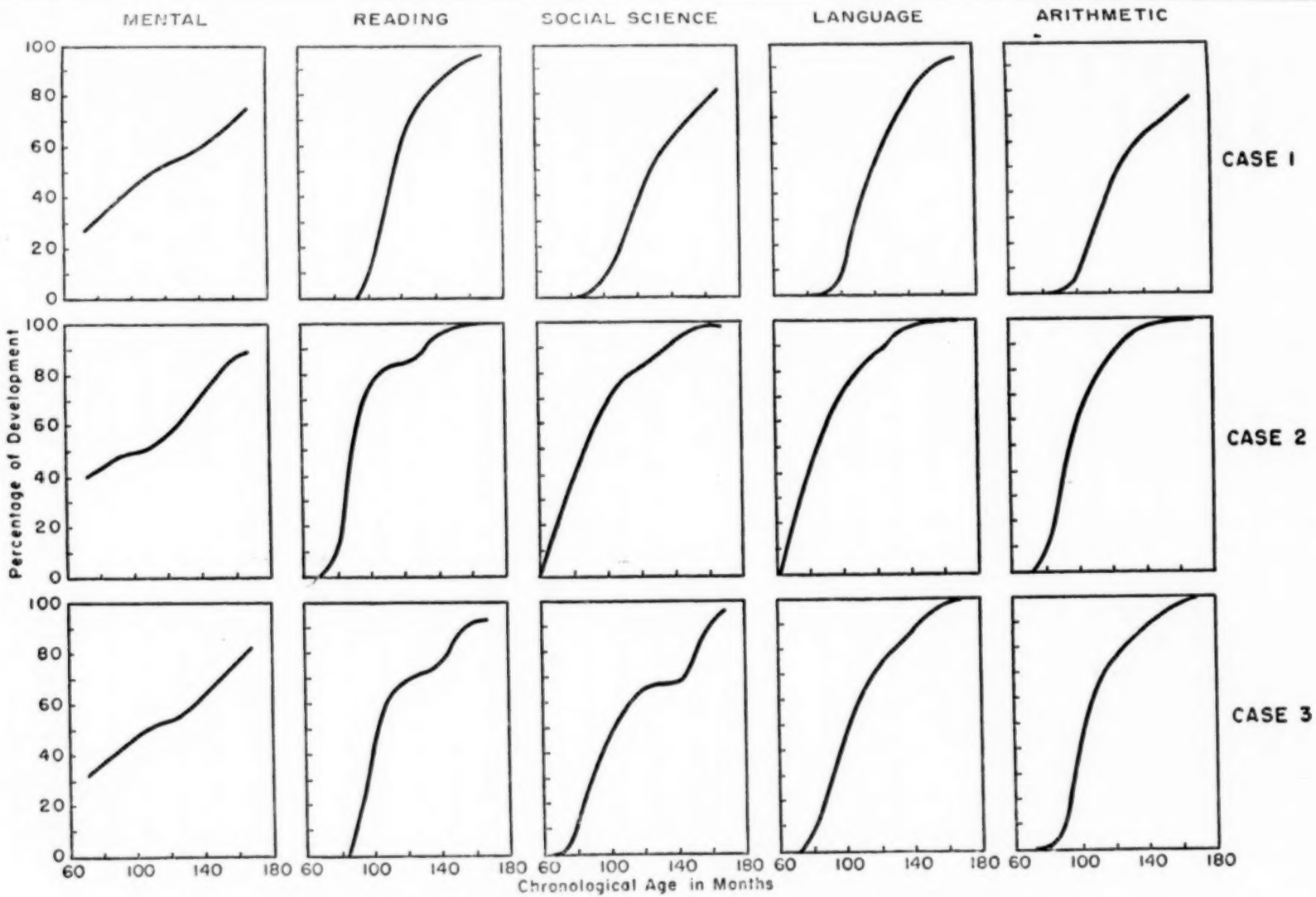

FIG. 2. "Cyclical growth" for three cases presented in Millard (*8*)

characteristics; and the minor 'jogs' in some of the other curves may have been produced by the unreliability of the measuring instruments. Of course, the original tabular material, larger graphs, or mathematical equations might reveal a spurt in these processes at adolescence, but the data as presented do not. Further, the age of onset of adolescence is not apparent from Millard's figures or his descriptive materials. These comments do not demonstrate that 'educational growth' is not cyclical in nature; but they do imply that the data presented by Millard are not satisfactory evidence of such a pattern of educational change.

THE PRINCIPLE OF FAMILIAL RESEMBLANCE

Evidence of familial resemblance is presented in graphical form by Olson the Hughes in Barker, Kounin and Wright. "The siblings available to our study show a high degree of similarity in the pattern of growth .... The illustration employed for brothers born thirty-three months apart, shows striking similarities in level and pattern for the six variables" (*1*, p. 205). Some of Olson's graphs are reproduced in Figure 3.

Similarity in the pattern of growth for some of the variables shown in the graphs is admitted if similarity refers to the general shape of the curves, but not if it implies that they are coincidental; this is true in some instances, but in others sibling differences of as much as twenty-four months occur. Little serious attention has been given to an analysis of patterns of growth; Olson does this by inspection. Some comparability in level of growth for siblings is to be expected, since siblings correlate about .50 in mental ability. A more systematic consideration of the problem might provide valuable information about the nature of growth processes.

The curves of Figure 4 have also been submitted as evidence that there is familial resemblance in educational 'growth'. Notice that the reading curve for one child (B″) is below that of his sibling (B) throughout the age range six to twelve years. Since the curves are roughly parallel, it might be argued that there is similarity in the pattern of 'growth' in reading. What of 'level'? Consider the reading ages of B and B″ at age twelve. The RA's are about 197 and 164 months respectively. Is this evidence for striking similarity of level of growth?

Surely serious application of this principle could lead to situations which Olson would deplore: "Conflicts between expectancies and

the child's growth are a frequent source of social and emotional repercussions" (*11*, p. 5). Child B″, in Figure 4, is approximately thirty months, two and one-half years, behind B in reading at

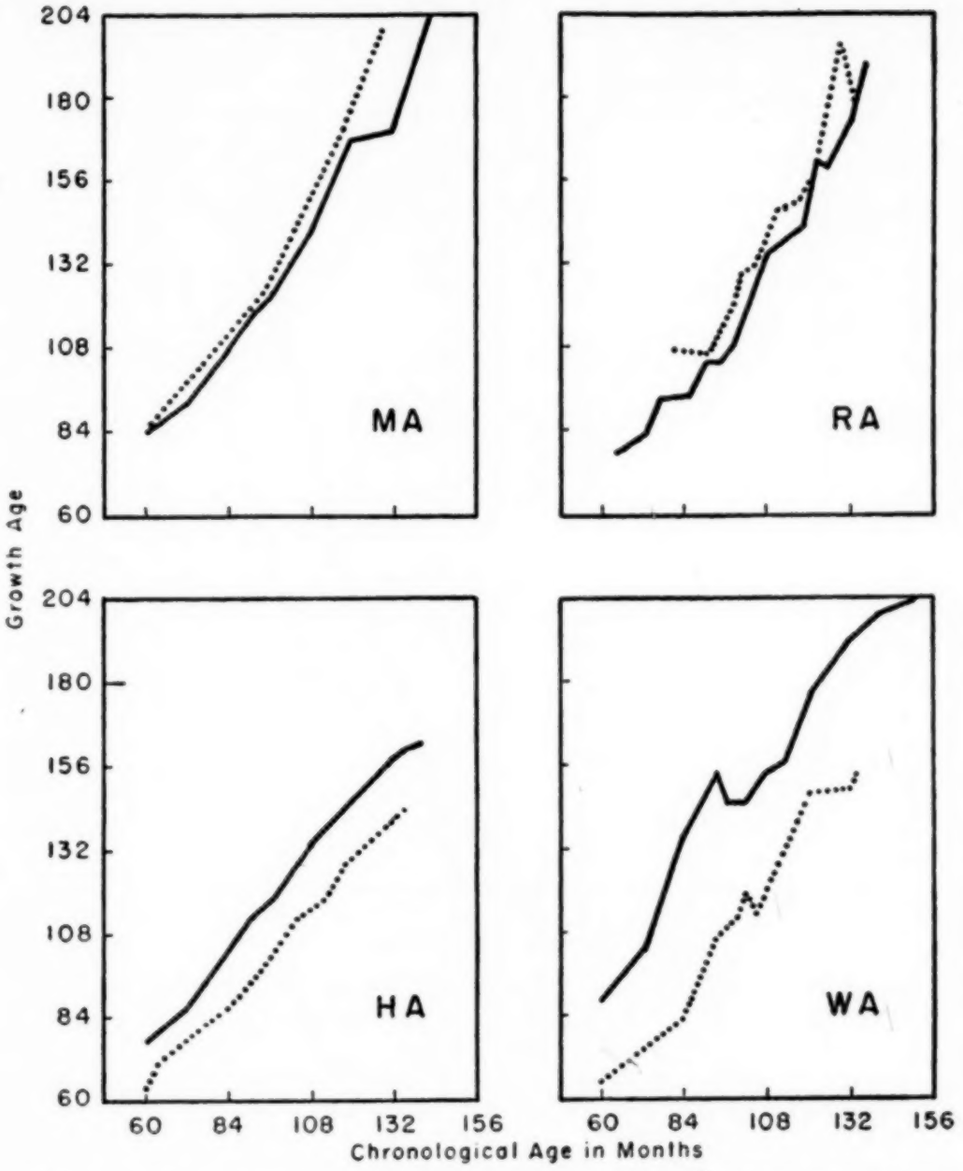

FIG. 3. Evidence on Familial Resemblance presented in Barker, Kounin and Wright (*1*).

twelve years of age, after approximately six years of formal education. If the parents had similar expectations for the two boys, as the principle of familial resemblance would suggest, then B″ might not have a very 'serene and productive' life either at home or at school.

DISPLACEMENT, CONVERGENCE, AND PERTURBATIONS

Olson suggested the hypothesis that "an environmental perturbation may be reflected with greater or less immediacy in the various structures and functions that are sampled in attempting to describe the total growth of the child" (*1*, p. 205). A part of the

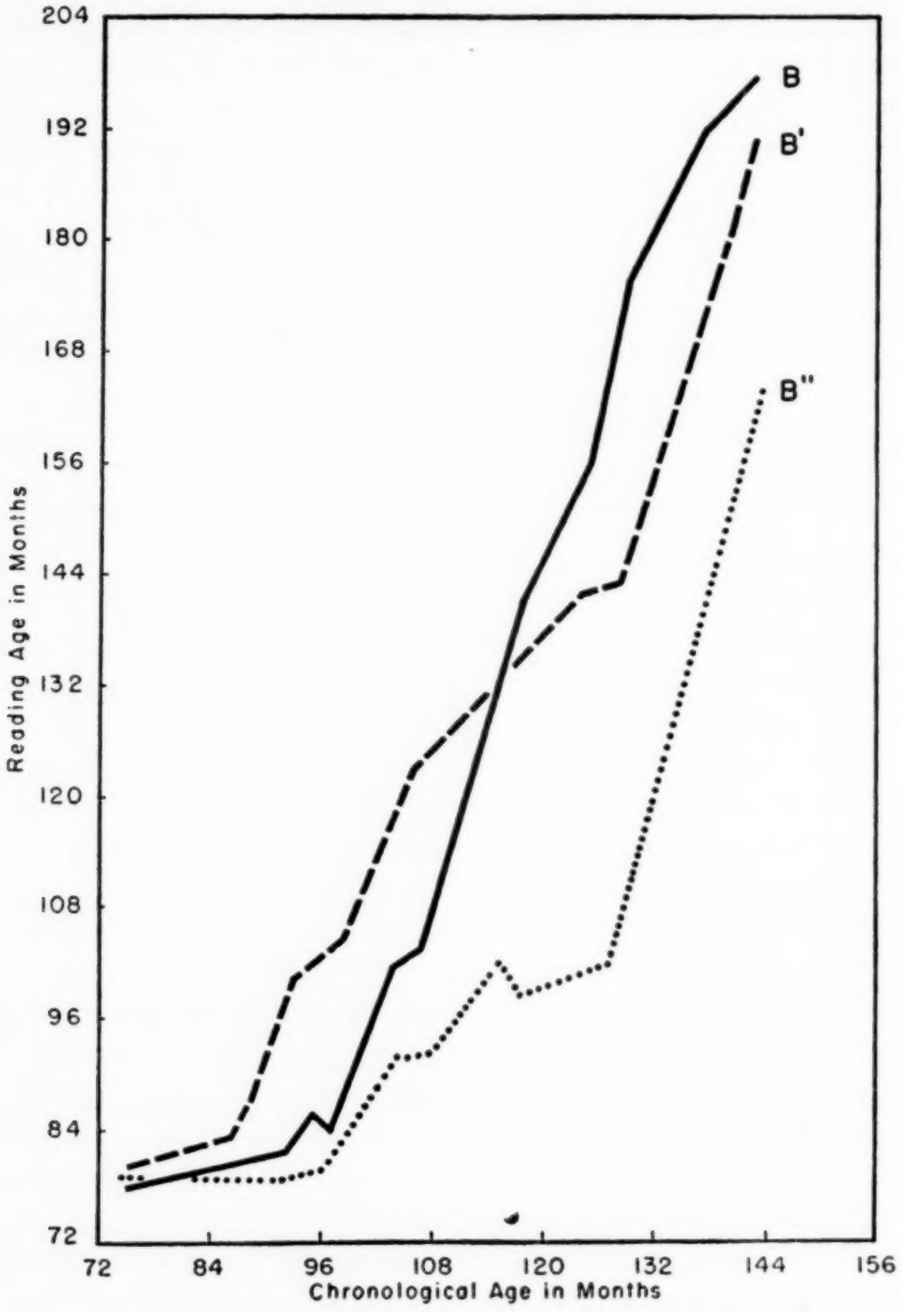

FIG. 4. Evidence on sibling resemblances in reading presented in Barker, Kounin and Wright (*1*).

graph used as evidence for this principle is reproduced in Fig. 5. It is recognized that Olson has used several qualifying expressions in the formulation of the principle relating to environmental perturbations: may, greater and less. Possibly the principle must be accepted as it is stated, but certain comments seem relevant.

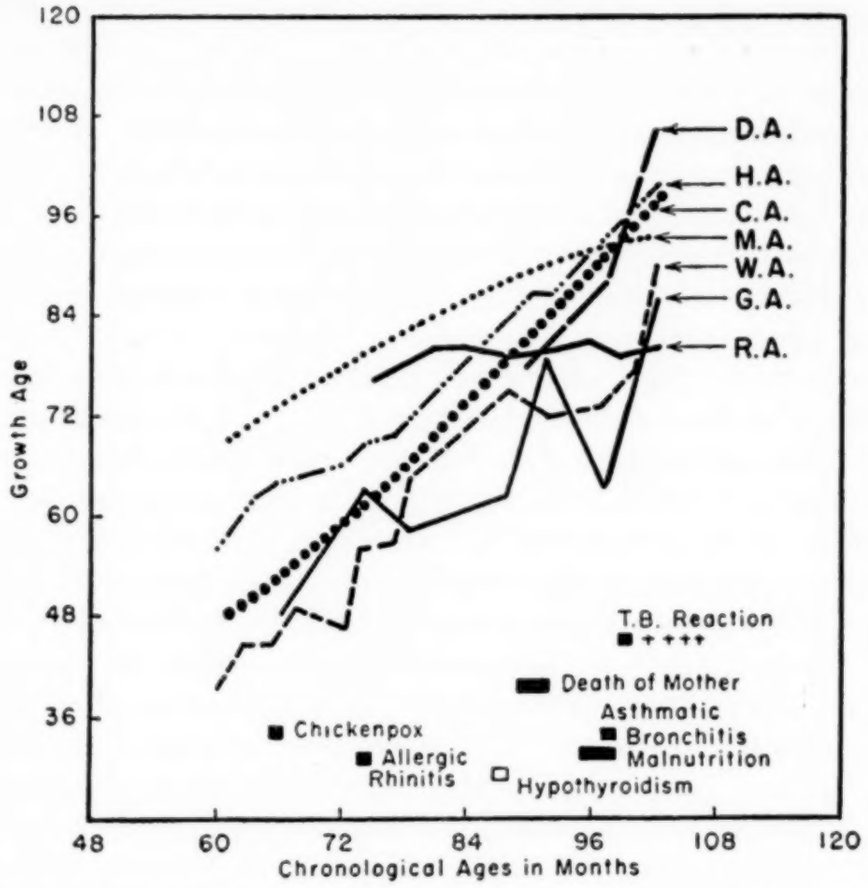

FIG. 5. Evidence of the effect of perturbations on growth presented in Barker, Kounin and Wright (*1*).

Olson drew attention to the change in the weight curve after about eighty-four months of age, suggesting that the change might be attributed to certain environmental factors operating at that time. However, it should be noted that there were no comparable changes in the curves depicting other types of growth, except possibly in the case of grip age. In this latter case, the irregularity after age eighty-four months might be more a matter of motivation than of any underlying change in growth in strength of grip. Possibly the 'hammering down' (to use Olson's phrase) by environmental shocks was more the exception than the rule in the case of

this child. It is worth observing, also, that the growth curve for weight was irregular even prior to the onset of the specific environmental shocks to which Olson draws attention.

Honzik, Macfarlane and Allen (*6*) reported that it was difficult to find environmental factors which would account for marked changes in mental growth. In some cases environmental forces could be correlated with changes in rate of growth, but not in others; sometimes environmental deprivations occurred at the same time as improvements in the rate of mental growth. "Children whose mental test scores showed the most marked fluctuations had life histories which showed unusual variations with respect to disturbing and stabilizing factors. However, there were other children whose scores remained constant despite highly disturbing experiences" (*6* p. 315).

On the basis of the curve shown in Figure 5, Olson proposed the principles of the resistance to displacement and the tendency toward convergence. According to these principles, a child tends to resist any external attempts to modify his rate of growth (which, for Olson, includes behavior and achievement) and to resume his normal rate of growth after cessation of these attempts to change his growth pattern. What is meant by the term normal in this context? Apparently it refers to the growth which occurs in the absence of any factor employed to produce a change. Surely it is reasonable to expect a change in the rate of growth (including learning) when any specially-introduced factors no longer operate. This is the essence of teaching, for teaching is reasonably regarded as an external attempt to modify the educational achievements of children in our society.

In discussing 'normal growth' Olson seems to imply an innate guiding force when he states: "Unfolding design appears inherent in the nature of a species, and the level and rate of emergence is also dependent on immediate ancestry" (*13*, p. 40). This may be more or less true of many phylogenetic characteristics, but it may be doubted that it is a factor of primary importance in learning geographical and arithmetical facts. The term 'normal growth' must, in addition, take into account the nature of the environment, especially if growth is to include learning of the type that occurs in our schools. It is 'normal' for a certain sea organism to develop two eyes in a specific type of environment; but it is just as 'normal' for it to develop a single eye when the environment is

modified in a certain direction (*18*, p. 7). 'Normal' growth means normal for a certain organism in a specific environment. From this point of view, teaching methods, including diagnostic and remedial procedures, readiness programs, etc., assume more, rather than less, significance in the educational 'growth' of the individual.

A study by Tilton has been cited as evidence on the inefficacy of remedial procedures for producing changes in the rate of educational 'growth' (*17*). It is questionable whether he would agree with some of the interpretations of his results. Some of the pupils showed significant gains as a result of special effort on the part of the teacher. The place of arithmetic in an educational profile was improved significantly (statistically and educationally) for ten of thirty-seven pupils; there were losses for some of them. The failure to find a larger number of significant gains might be attributed to the fact that the teachers did not plan and execute an effective remedial program. Tilton apparently suspected such a condition, for he suggested that it is "conceivable that poor remedial effort may do more harm than good." It is unreasonable to accept Millard's conclusion that "Tilton's study shows the futility of diagnostic and remedial activities in producing permanently improved achievement" (*8*, p. 51). Certainly there were changes in the educational profiles of some of the children in some of the classrooms. The average gain may have been approximately zero—but this could arise from gains being balanced by losses. Certainly the term 'permanent' cannot be applied to the results of Tilton's study, which required a rather short period of time and which involved no long-time follow up.

SUMMARY

Some of the facts, concepts, and principles of growth and development of children found in several papers and two recent textbooks were selected for consideration and analysis. These concepts were analyzed from several points of view:

a) statistical bases and meaning;
b) psychological meaning;
c) validity of the interpretation of the basic data;
d) educational implications.

It was pointed out that the greater predictability of organismic age compared with other types of ages was a statistical artifact; this age, being the mean of a series of other ages, can be expected

to have greater stability. The statistical meaning of the OA was questioned on the grounds that there is no evidence that age units are equal. The significance of certain types of ratio comparisons is in doubt since the location of absolute zero on the scale has not been established. The psychological meaning of certain concepts was questioned, as, for instance, the meaning of the average of a series of age scores of such diverse structures and functions as height, dentition and skill in arithmetic.

In certain cases, it seemed doubtful that proposed conclusions necessarily followed from the data. For example, there is some question about the presence of cycles in educational 'growth'. Finally, the validity of some of the proposed educational implications was questioned, particularly with reference to instructional methods and readiness programs. Of course, neither Olson nor Millard really means that teaching methods and materials are not important: "The second implication relates to the tremendous responsibility of the school for providing the enrichment so essential for maximum language development. From this point of view, the schools that use explorations, broad area projects, new experiences of all kinds, new books, new observations are providing an educational program in harmony with a great majority of the research findings" (*8*, p. 171). The fact that educational planning must consider genetic and maturational as well as environmental factors in growth cannot be refuted. A one-year-old child cannot read or compute or play tennis or chess or the piano. On the other hand the ability to do these things is not simply a matter of allowing a design to unfold during the passage of time.

CONCLUSIONS

The basis and the meaningfulness of certain concepts have been questioned; this does not mean that many of the proposals for educational materials and methods are erroneous and fallacious. To raise questions, however, is not to imply that educators can safely ignore the facts and generalizations of growth and development. Buswell recently drew the attention of educators to the importance of an understanding of the learner for curriculum planning. However, he was impelled to observe that much of the work in the field of growth and development, and that many of the suggestions for education were "characterized by sentimentalism and lack of valid techniques. But the movement embodies the kernel

of a significant idea and has important implications for the curriculum worker" (*9*, p. 462).

The principles proposed by Olson and Millard may be sound; but the possibility of invalidity in the evidence and in the interpretations has been suggested. Empirical studies might reveal that such concepts as the age unit and the organismic age have the values claimed for them despite their logical weaknesses. Analyses of longitudinal data to test specific hypotheses arising from the questions raised in this paper are necessary. Investigations are urgently needed in view of the educational importance of the facts, principles and concepts about the growth and development of children. Various hypotheses using longitudinal data are now under investigation at the Institute of Child Welfare, University of California. Such studies should provide further evidence on the nature and interrelationships of physical, mental, educational, social and emotional changes that occur in the first eighteen years of life.

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THE CONTRIBUTIONS OF FILM INTRODUCTIONS AND FILM SUMMARIES TO LEARNING FROM INSTRUCTIONAL FILMS[1]

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This exploratory study is concerned with investigating the contributions to learning of some introductory and summarizing sequences in existing instructional films. The study is divided into two parts: Part I deals with film introductions; Part II deals with film summaries.

I. FILM INTRODUCTIONS

A 'Film Introduction' is defined as that portion of a film, excluding the main and credit titles, which begins the presentation, and runs up to the beginning of the body of the film. The purpose of this part of the study was to measure the effect on learning of some introductory sequences in existing instructional films.

One hundred and thirty instructional films containing introductory sequences were viewed and classified according to (1) the functions which introductions appeared to perform, and (2) the film techniques employed. Eleven different functions of a film introduction were identified. They are listed in order of frequency of use.

1) Stresses the importance of the material in the film.
2) Poses the problem to be dealt with in the film.
3) Introduces the characters to appear in the film.
4) Sets the stage, that is, orients the audience to the scene of the action.
5) Gets attention of the audience by some dramatic device.
6) Points out important features which will be developed in the film and to which the audience should pay special attention.
7) Stresses the consequences if the material in the film is not learned.

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[1] This research was conducted by the Instructional Film Research Program, The Pennsylvania State College, under Contract N6-onr-269, Task Order VII, with the Special Devices Center of the Office of Naval Research.

8) Shows the learner the relevance of the material in the film to what he has learned previously.

9) Explains to the instructor the situation for which the film is intended.

10) Provides additional inspiration which might motivate the student or trainee to undertake further activities after seeing the film.

11) Shows the purpose of the film.

Twelve different film techniques were used in the presentation of the introductory sequences in the one hundred and thirty films reviewed. They are listed in order of frequency of their use.

1) Live action
2) Narration by an off-stage commentator
3) Demonstration of a task being performed
4) Diagrams, still shots, tables, graphs, maps
5) Animation
6) Use of models (scale representations)
7) Titles to explain the film, etc.
8) Flashes forward (short shots of scenes to follow are included in the introduction).
9) Remarks by an authority on the subject
10) Slow motion or speeded motion
11) 'Dramatic' live action (action used with dramatic effect).
12) Audience participation (as in asking a question and allowing time for an answer).

THE EXPERIMENTAL PROCEDURE

The Films.—From the films reviewed three were finally chosen by a panel of instructors as having what seemed to be the best introductory sequences. Their characteristics are given in Table I.

The Experimental Versions.—Two experimental versions were prepared for each of the three films: Version I was the complete film; Version II was the same film minus the introductory sequence only. The preparation of the 'no introduction' versions was a comparatively easy matter as, in each film, there was a fade-out in the visuals and a break in the sound track between the credit titles and the introduction, and between the introduction and the main body of the film. The main title and credit titles were included in both versions of each film.

The Tests.—Tests were constructed on the material in each of

TABLE I. CHARACTERISTICS OF FILMS USED IN THE STUDY OF FILM INTRODUCTIONS

Title	Total Film Length	Length of Introduction	Functions of Introduction	Film Technique used in Introduction	Subject Type
Sulphur and Its Compounds	387 ft. 10 min. 45 sec.	65 sec. 10.1% of total	Stressing importance Introducing characters Setting the stage	Live action Models Title Narration	General Science-Chemistry
Mammals of the Rock Mountains	369 ft. 10 min. 15 sec.	45 sec. 7.3% of total	Setting the stage	Live action Animation Narration	General Science-Biology
Rivers of the Pacific Slope	414 ft. 11 min. 30 sec.	25 sec. 3.6% of total	Stressing importance Setting the stage Posing the problem	Live action Narration	General Science-Geography

the three films, bearing on the facts in the body of the film only; no questions were asked on the facts contained only in the introduction. Multiple-choice test questions each with four choices were asked on three different classes of facts in the films:

1) the facts contained in the visuals only
2) the facts contained in the sound track only
3) the facts found in both the visuals and sound track

Pilot-runs were made to check the reliability of the tests, and poor questions were eliminated. Each test finally included from fifty to sixty items.[2]

Test Population.—Approximately five hundred ninth-grade high-school students from two schools took part in the experiment. Good coöperation from the schools made it possible to achieve a practical degree of randomization of the entire ninth-grade population in each school into three groups.

One group acted as a control group and took the test without seeing the film. The second group saw the complete film (Version I), while the third group saw the 'no-introduction' version (Version II). The groups were rotated so that each group became a different experimental group for each of the three films. Thus, each group acted as a control group for one film, as a group seeing the version without the introduction for another, and, finally, as a group seeing the entire film for the third. The groups were also rotated with respect to projection rooms and test administrators.

The test followed immediately upon the film-showing.

RESULTS OF THE EXPERIMENT

The results of the experiment are summarized in Table II. These results show that the groups which saw the experimental films generally did somewhat better than the control groups which did not see the films. However, the differences between the groups which saw the entire film, and those which saw the film minus the introduction were small. For two films the introductions apparently made small positive contributions ('Sulphur and Its Compounds' +1.14, 'Rivers of the Pacific Slope' +1.81), while for the third film, 'Mammals of the Rocky Mountains', the introduction apparently had an adverse effect on learning, the difference between

[2] Kuder-Richardson coefficients of test reliability were as follows: Sulphur and Its Compounds .57; Mammals of the Rocky Mountains .69; Rivers of the Pacific Slope .72. These are minimum estimates of reliability.

experimental groups being −2.55. This latter unexpected result was carefully checked and proved to be authentic.

The results indicate that among existing films, typical introductory sequences can make small positive contributions to learning, while in other instances introductions may have an adverse effect on learning, possibly through misdirecting the student's attention.

TABLE II. SUMMARY OF TEST SCORES

	Control Group	Film minus Introduction Group	Complete Film Group	Difference Attributable to Introduction
(a) "Sulphur and Its Compounds"				
Number of Subjects	168	166	168	
Mean Score	16.97	21.61	22.75	+1.14*
Standard Deviation	3.43	5.45	5.36	
(b) "Mammals of the Rocky Mountains"				
Number of Subjects	168	171	174	
Mean Score	22.55	31.23	28.68	−2.55***
Standard Deviation	4.93	7.27	6.63	
(c) "Rivers of the Pacific Slope"				
Number of Subjects	165	167	164	
Mean Score	16.23	22.96	24.77	+1.81**
Standard Deviation	4.10	5.95	6.70	

* Significant at the 6% level of confidence
** Significant at the 1% level of confidence
*** Significant at the 0.2% level of confidence

II. FILM SUMMARIES

The term 'Film Summary' as used here, refers to a concluding sequence produced as an integral and purposeful part of an educational film. It embraces one or more of the functions of review, recapitulation, statement of importance, and the issuing of a challenging note; it may also contain an 'application' of the information given in the film. The film summary is usually preceded by a fade in the visuals, and a natural pause in the sound track, which separates it from the body of the film. It does not include 'The End' title.

The purpose of this part of the study, which paralleled the study of film introductions, was to measure the effect on factual learning of the summary sequences in some existing instructional films.

Eighty-seven instructional films, which included summaries, were analyzed and classified according to the purpose for which the summary appeared to be used, the film techniques employed, and the length of the summary in relation to the total length of the film.

Six different functions served by film summary sequences were identified. They are listed in order of frequency of use.

1) *Review.*—A mere topical outline of the film; a brief restatement of the organization of the film rather than of its informational content.

2) *Application.*—The illustration of a point of information by a concrete example.

3) *Importance.*—Stressing the value to the viewer of the information in the film.

4) *Challenging note.*—The issue of a challenge to the viewer to apply the information in the film, or to seek further information, or to undertake other activities. This heading would also include the posing of questions for thought or discussion.

5) *Recapitulation.*—A brief repetition or restatement of the principal points in the film.

6) *New information.*—The summary may contain information not previously given in the film, or it may relate the film to new material to follow.

The film techniques used in the presentation of the eighty-seven film summaries were also listed. They are given here in order of frequency of use.

1) *Live action.*—Simple movement as from real life.

2) *Narration.*—The off-stage voice of a narrator.

3) *Flash backs.*—The reshowing of parts of scenes used in the body of the film.

4) *New scenes.*—Scenes not shown previously in the film.

5) *Music.*—Musical background behind commentary.

6) *Animation.*—Use of drawings and charts, etc. with movement.

7) *Questions.*—Asking question, either by titles, or narration.

8) *Lip-synch.*—A person on the screen speaking, with synchronous recording of the speech.

9) *Still shots.*—Photographs or drawings or diagrams without movement.

THE EXPERIMENTAL PROCEDURE

The Films.—Three films were finally selected from the eighty-seven reviewed, as having what appeared to be the best summary sequences. The characteristics of these films are given in Table III.

The Experimental Versions.—For each of the three films, two experimental versions were prepared: Version I was the complete film, Version II was the same film minus the summary sequence. The 'End' title was retained in each version.

The Tests.—Tests were constructed which were based on the information in the body of the film, and not on items appearing only in the summary. Multiple-choice questions with four alternatives were used, together with a proportion of true-false questions. A pilot study was made to determine the reliability of the three tests, and the tests were revised and proved for use in the final study.

The test on *The Cell* contained fifty-eight questions, eleven of which were true-false; the test on *Magnetism* contained sixty questions, eight of which were true-false; and the test on *Rivers of the Pacific Slope* contained fifty-two questions, all of which were of the multiple-choice type.[3]

Test Population.—Five hundred and sixty-one ninth-grade students from three Pennsylvania high schools were tested in this experiment. Good coöperation by the schools made it possible to achieve a practical degree of randomizing by splitting the entire ninth-grade population of each school into three experimental groups.

As in the study of Film Introductions, one group acted as a control group and took the test without seeing a film, while a second group saw the complete film (Version I), and the third group saw the film minus the summary (Version II).

The groups were rotated so that each group became a different experimental group for each of the three films. The rooms for film showings and the test administrators were also rotated to distribute any differences which may have arisen from these variables.

The test followed immediately on each film showing.

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[3] Kuder-Richardson coefficients of test reliability were as follows: The Cell .82; Magnetism .83; Rivers of the Pacific Slope .69. These are minimum estimates of reliability.

TABLE III. CHARACTERISTICS OF FILMS IN THE STUDY OF FILM SUMMARIES

Title	Total Film Length	Length of Summary	Function of Summary	Film technique used in Summary	Subject Type
The Cell: Structural Unit of Life	370 ft. 10 min. 15 sec.	1 min. 15 sec. 12.2% of total	Review Recapitulation Stresses Importance Challenging Note New information	Music Animation Narration Flash backs Live Action	General Science-Biology
Magnetism	398 ft. 11 min. 4 sec.	1 min. 5 sec. 9.8% of total	Review Recapitulation Application Stresses Importance New Information	Music Narration Live Action Lip Synch New Scenes Flash backs	General Science-Basic Principles of Magnetism
Rivers of the Pacific Slope	387 ft. 10 min. 45 sec.	1 min. 24 sec. 13.0% of total	Review Recapitulation Application Importance Challenging Note	Music Animation Commentary Live Action Flash backs	General Science-Geography

RESULTS OF THE EXPERIMENT

The results of the experiment are summarized in Table IV. These results indicate that the groups which saw the films did definitely better on the tests than the control groups which did not see the films. The differences were small between the groups which saw the complete films, and those which saw the films minus the summaries. For all three films the summaries made small positive

TABLE IV. SUMMARY OF TEST SCORES

	Control Group	Film minus Summary Group	Complete Film Group	Difference Attributable to Summary
(a) "The Cell: Structural Unit of Life"				
Number of Subjects	192	184	185	
Mean Score	24.67	33.00	33.57	+0.57
Standard Deviation	5.65	7.19	8.52	
(b) "Magnetism"				
Number of Subjects	184	185	192	
Mean Score	32.94	37.00	38.93	+1.93*
Standard Deviation	8.99	8.66	8.57	
(c) "Rivers of the Pacific Slope"				
Number of Subjects	185	192	184	
Mean Score	17.10	24.95	25.25	+0.30
Standard Deviation	4.34	6.86	6.30	

* Significant at the three per cent level of confidence.

contributions to learning, the differences in favor of the films with summaries being as follows:

The Cell: Structural Unit of Life	+ .57
Magnetism	+1.93
Rivers of the Pacific Slope	+ .30

It should be noted that only one of these differences (for the film *Magnetism*) reached accepted levels of statistical significance.

The results suggest that these films, which include what seemed to be the best available summary sequences as produced today, are not materially better than they would be without the summaries.

DISCUSSION AND CONCLUSIONS

Failure of the introductions and summaries to contribute significantly to learning from the films used might be attributed to one or more of the following factors:

1) *The short time devoted to introductory and summary sequences.*—The average length of time devoted to summaries or introductions was 9.6 per cent of the total film running time. The shortest introductory or summary sequence was 3.6 per cent of the film-running time; the longest was 13 per cent.

2) *Learning from the films themselves (without summaries or introductions) was comparatively low.*—The highest mean learning increment was only nine points on a 58-item test. This low level of learning could be the result of the fact that all of the films used in this experiment presented a considerable amount of factual information in a very brief time. (A fifty- or sixty-item test was readily constructed on each ten-minute film.) Under such conditions, it seems possible that no short summary or introduction could contribute significantly to learning from the films. This is especially true, perhaps, when we consider that summaries and introductions are not mere positional designations; they refer to elements of the film which function in integration with the main body of the film. It is likely that they do not make a simple addition to the film's effectiveness. Their effectiveness is no doubt conditioned by the characteristics of the main film. The rapid rate of development in the films studied, then, may very well have operated against the effectiveness of summaries and introductions. It might be hypothecated that the 'better' the film, the more effective the summary or introduction can be.

3) Although the films studied in this experiment were selected because their introductory and summary sequences appeared to incorporate useful teaching principles, there is no assurance that they represented the most effective application of those principles; nor is there any assurance that the summaries and introductions studied did, in fact, represent the 'best' summaries of their lengths and kinds.

4) Where the function of a summary is to increase discrete factual learning, the effectiveness of the summary is obviously limited by the number of pictures and the amount of commentary which it contains, and the time that is devoted to it. In such a case, the effectiveness of the summary, measured by a test of discrete

factual knowledge, would seem to be necessarily limited. Where the summary is used, however, to restate principles, or to formalize and crystallize concepts that have been demonstrated or shown in the film, conceivably its effect on learning may be more significant.

5) With regard to introductions, it might be hypothecated that an introduction can be made to contribute significantly to learning from a film if it provides a motivational stimulus or 'set', or if it relates what is to be taught in the film to the previous experience of the audience. It is interesting to note that in very few of the films examined was the introduction used to state the objectives of the film.

In the light of this discussion, then, the findings of this experiment cannot be generalized; it cannot be concluded that introductions and summaries, in general, make no significant contribution to learning from films.

The experiment suggests that introductions and summaries cannot be considered as single variables; rather, they involve a complex of variables similar to those which determine the effectiveness of the film itself.

The length of introductions and summaries, the relationship they bear to the main body of the film, the degree to which they are integrated with the main body of the film, and the functions which they can perform are all important variables which should be systematically investigated in future studies.

GROUP THERAPY WITH RETARDED READERS

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The importance of the problem of the retarded reader is indicated by the large time allotment that is assigned to remedial reading in the elementary school, the wealth of teaching devices that have originated in relation to it, and the numerous investigations that have been made in this field. Authorities are in agreement that most other school subjects are affected by reading ability. "These are admitted facts and are examples of an increasing number of findings that emphasize the value of establishing good reading habits." (*11*)

Failures in reading are frequent and many pupils never acquire adequate reading skills. Gates states: "Despite the quantity of experimental data, the wealth of ingenious teaching devices, the range of interesting children's reading material and the large amount of school time available for teaching reading, a surprisingly large number of pupils still experience difficulty in acquiring satisfactory reading skills." (*11*)

In one study it was found that reading was, "the most frequent cause of school failure." (*15*) Schonell (*18*) found that the amount of reading failure in ten different primary classes averaged 22.6 per cent. Betts (*4*) estimated that approximately ten per cent of American school children require special assistance because of reading disabilities. These estimates of the number of children troubled by reading failures indicates the magnitude of the problem.

The varied approaches recommended for the remediation of reading disabilities are usually related to the authorities' beliefs concerning the cause of the disability. These causes may be grouped under the general categories of physical, psychological, educational, emotional and social, or a combination of causes. Gann (*9*) reviewed a large number of representative investigations and points of view that stress particular functions or group of functions that produce reading difficulty. She concludes: "though the review persents points of view bearing a positive relationship to reading

difficulty, numerous studies can be located in the literature negating these findings." She concludes, "the conclusiveness of the various approaches already existing cannot be established."

Despite this variety of inconclusive evidence, remedial reading teachers who use different approaches based upon the findings of the authority or authorities with whom they are acquainted usually achieve some degree of success. It has recently been suggested (*1*, *2*, *5*, *8*) that in addition to the improvement of reading techniques for the correction of reading disabilities, the psychotherapeutic relationship of the teacher, tutor, or clinician was a major factor in the correction of the reading disability. This suggests the possibility that all of the remedial methods may have had in common a psychotherapeutic relationship that arises when one person attempts to help another.

In support of this hypothesis, Axline briefly noted the varied attacks that had been made upon the reading problem. "(The varied attacks) gave the same results: successful in many cases, useless in others. These varied methods have one characteristic in common: the motivation of the teacher." (*2*) She described an experience with thirty-seven second-graders who were poor readers or non-readers and whose teacher tried to help them by using a non-directive therapeutic approach. She employed art materials, free dramatics, puppet plays, music, creative writing, etc.

Axline concluded by stating: "This study indicates that a non-directive approach might be helpful in solving certain 'reading problems.' It indicates that it would be worth while to set up research projects to test this hypothesis further: that non-directive therapeutic procedures applied to children with reading problems are effective not only in bringing about a better personal adjustment but also in building up a readiness to read." (*2*)

Bills described a study in which he worked with a class of third-graders who had previously been classified as slow learners. He concluded that: "1) Significant changes in reading ability occurred as a result of the play therapy experience, 2) personal changes may occur in non-directive play therapy in as little as six individual and three group play therapy sessions, and 3) there appears to be no common personality maladjustment present in (his) group of retarded readers." (*5*)

An earlier investigation into the relationship between the improvement in emotional adjustment and the improvement in

reading, is Redmount's (*16*) 'before' and 'after' study of a resident six weeks' summer clinic for twenty-three children with reading difficulties. Reading tests showed that forty-eight per cent improved and twelve per cent seemed to regress. Rorschach tests indicated that thirty-nine per cent showed personality improvement, with twenty-six per cent adversely affected.

Many articles have called attention to the relationship between personality and the reading process. Strachey (*19*) from the psychoanalytic point of view, stated that reading represents a sublimation of oral tendencies, especially those of a sadistic and destructive nature. He feels that skill in reading breaks down when these oral drives are unstable or completely repressed and sublimated. Klein (*14*) suggested that for those children whose neurotic conflicts are largely concerned with trying to keep aggressive drives repressed, sublimated expression of reading may not be permissible to ego and super ego. A recent investigation by Vorhaus (*21*) tends to support these early hypotheses. Blanchard (*6*) described two groups of individuals who display reading disabilities: (1) the non-neurotic who develops emotional conflicts largely out of inability to read, (2) the neurotic whose emotional conflicts and difficulties in personality have preceded the reading difficulties which have arisen from these early maladjustments. Hardwick (*13*) stated that many reading cases show evidence of timidity and inferiority. Bennett (*3*) noted lack of persistence and attention, preference for solitary and inactive life, fears, indecisions, loneliness and crying spells among the retarded readers. Gates (*10*) pointed out that children with reading difficulties lack persistence, do not concentrate well, show marked sensitivity, are withdrawn, daydream and show a lack of aggressiveness, necessary for effective adaptation in learning to read. Tulchin (*20*) came to the conclusion that undesirable behavior patterns or personality maladjustment may be traced to reading disability. Witty and Kopel (*22*) found that fully fifty per cent of seriously retarded readers are characterized by fears and anxieties which require a program of reëducation aimed at the reëstablishment of self-confidence and the removal of anxieties.

Evidence like the above caused this investigator to hypothesize that if reading disabilities are in large part caused and effected by emotional adjustment, then psychotherapeutic steps would help to remove the disability. To test this hypothesis the following study was conducted.

DESIGN

The subjects were twelve residents of the Children's Village, an institution for delinquent boys. These twelve were part of a larger group which was receiving special remedial reading instruction. The subjects were all designated as having a reading disability on the basis of their past school history, case record and psychological

TABLE I. TEST DATA FOR EXPERIMENTAL GROUPS

	IQ	Age	Initial Reading Age	Final Reading Age	Gain in Months
Therapy Group					
A	90	11-1	6-7	7-11	16
B	97	12-0	7-5	8-1.5	8.5
C	92	12-2	7-6	9-0.5	18.5
D	85	11-7	7-9.5	8-3.5	6.0
E	92	11-8	8-0	8-7.5	7.5
F	96	11-9	8-7.5	9-8	12.5
Mean	92	11-8	7-8	8-7	11.5
Non Therapy Group					
AA	82	10-5	7-1.5	7-10.5	9.0
BB	97	12-9	6-11	7-8	9.0
CC	86	12-4	7-6	8-10.5	16.5
DD	88	11-11	8-5	9-6.5	13.5
EE	93	12-1	8-7.5	8-9.5	2.0
FF	107	11-11	8-10	8-9.5	−.5
Mean	92.1	12-3	7-11	8-7	8.25

test results. As is indicated in Table I they ranged in age from ten years, five months to twelve years, nine months. Their initial reading abilities, as designated by reading age, ranged from six years, seven months to eight years, ten months. They were all more than three years retarded in reading, had the same regular classroom teacher, and received remedial reading instruction for three hours each week from the same remedial teacher.

All the subjects were initially tested with the Wechsler Intelligence Scale for Children and the Gates Advanced Primary Reading Tests. They were then divided into two groups by the paired comparison method and were matched for age, IQ, and initial

reading ability. While both groups received remedial reading instruction, one group was arbitrarily chosen to participate in nondirective or group centered therapy meetings which followed the principles established by Rogers, (*17*) Hobbs, (*12*) and others and were conducted by the author.

The subjects met as a group once each week for one hour. The therapist started the meetings with an initial structuring of the situation. The subjects were told that the opportunity to speak freely about their feelings, attitudes, and past and present experiences is usually helpful in making a better adjustment to their present situation and eventually to their homes. They were told that they were free to discuss any topic without restraints or value judgments imposed upon them by the therapist. The therapist's rôle was to reflect and clarify to the group, the ideas, feelings and behavior that occurred in the group meetings.

The group meetings and the remedial reading program were continued for six months. The twelve subjects were then retested with an alternate form of the Gates Advanced Primary Reading Tests. The 'before' and 'after' reading test results plus other pertinent data are presented in Table I. The final reading results indicate that the group which received group psychotherapy in addition to remedial reading instruction showed the greater improvement in reading. The non-therapy group showed a range of improvement in reading from −.5 to 16.5 months for a mean gain of 8.25 months. The group that received group psychotherapy ranged in reading improvement from 6.0 to 18.5 months for a mean gain of 11.5 months. This latter group gained 3.25 months or 39.4 per cent more than did the non-therapy group.

SUMMARY AND CONCLUSION

Many approaches are presently being used to correct reading disabilities. Many of these approaches seem as often to be successful as unsuccessful. The present study hypothesized that it is the improvement in emotional adjustment that occurs because of the psychotherapeutic relationship between the reading clinician and the disabled reader which is the common factor in most of the remedial reading techniques which are in use. To test this hypothesis, one of two matched groups of retarded readers participated in a program of group psychotherapy in addition to the regular remedial program. This group showed a 39.4 per cent greater

improvement in reading than did the control group. It is therefore concluded that with the subjects studied the psychotherapeutic relationship was an important factor in the correction of reading disabilities.

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"THE ESSENTIAL HIGH SCHOOL CONTENT BATTERY" AS A PREDICTOR OF COLLEGE SUCCESS

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The predictive power of the *Essential High School Content Battery* was examined in three New England Universities; namely, the Universities of Vermont, New Hampshire, and Maine. In addition, an intelligence measure was used; the relationship between the predictor variables and the criterion, i.e., first semester grade-point averages, was expressed by means of multiple correlation coefficients which are reported herein.

The Essential High School Content Battery is a newly published test[1] which can be given from the end of the ninth grade through the end of the twelfth grade, and with beginning college freshmen. It covers the four basic areas of high-school instruction; namely, science, mathematics, social studies, and English. Test I. Mathematics, contains items measuring fundamental skills in computation, vocabulary and concepts, understanding of functional relationships, application of mathematics to life problems, interpretation of mathematical graphs, knowledge of mathematical facts and formulas, interpretation of data in tabular form and knowledge of important theorems. Test II. Science, contains items covering science information, using the concepts of science and using the methods of science. Test III. Social Studies, measures acquaintance with contributions of famous Americans, understanding of current social and political problems, understanding of vocabulary of social studies, knowledge of civic information, growth of American democracy, knowledge and understanding of global geography, knowledge of contributions of world leaders, understanding of international relationships, knowledge of sequence of events in United States history and knowledge of world events. Test IV. English, contains items measuring reading for information, vocabulary, business definitions, use of references, literature acquaintance, language usage, capitalization and punctuation, and

[1] D. P. Harry, and W. N. Durost. *Essential High School Content Battery, Manual of Directions*. Yonkers-on-Hudson: World Book Co., 1951, p. 1.

spelling. It can be assumed that the Battery contains some of the determinants of college success, or more specifically of success in the freshman year. Examination of the freshmen curricula in all three universities revealed that the required courses contain English in all instances and courses in one or more of the other major fields of high-school instruction. It was therefore concluded that the Battery could be regarded as a logically valid predictor of college success to the extent to which (1) the test scores reflect true differences in scholastic achievement, (2) the objectives of college instruction in the four areas measured by the Battery are the same or related to the objectives of high-school teaching, and (3) the objectives of college instruction are properly evaluated and their attainment appropriately represented by the conventional numerical grades.

The experimental sample.—Out of some 6000 high-school seniors who were tested with the Battery in Vermont, New Hampshire, and Maine in the spring of 1950, about 240 were found to have been enrolled as freshmen in the fall of 1950 in the institutions mentioned above. Thus, grade-point averages could be obtained for some forty-three students in University X, seventy-three in University Y, and for one hundred eighteen students in University Z.

Reliability analysis.—The accuracy of prediction is limited by the reliabilities of the measures through which the performance is manifested. In order to be able to estimate to what extent an imperfect correlation between test and criterion is due to lack of overlapping in function and the extent to which it is due to lack of precision of measurement, split-half reliability coefficients were computed for the four subtests of the Battery. For this reason, each subtest was divided into two halves and special care was taken to make them equivalent with respect to (1) type or content of each item, (2) Flanagan validity indices, and (3) difficulty indices based upon a random sample of the New England population tested. Table I gives the results of the reliability analysis.

The above data are based on the total experimental sample of 234 college students enrolled in the three universities. On the whole the measures can be regarded as possessing satisfactory reliability for interpretation of group results. The reliability coefficients found in this study are generally lower than the ones reported in the

Manual.[2] This result was to be expected since the data are based on a relatively homogeneous sample, i.e., high-school students who had entered college. Thus the following validity data must be interpreted in the light of the somewhat lower reliability coefficients.

TABLE I.—SPLIT-HALF RELIABILITY COEFFICIENTS, MEANS AND STANDARD DEVIATIONS OF THE TWO HALVES OF EACH SUBTEST OF THE BATTERY

Test	r_{ab}*	r_{tab}†	M_a	SD_a	M_b	SD_b	N
Mathematics	0.82	0.90	16.56	5.97	16.06	6.09	240
Science	0.72	0.84	22.12	4.92	22.66	4.79	240
Social Studies	0.80	0.89	26.51	6.62	25.05	6.75	240
English	0.81	0.90	97.27	9.51	95.43	9.68	240

* Obtained Split-half reliability coefficient.
† Corrected by Spearman-Brown formula.

TABLE II.—PRODUCT-MOMENT CORRELATION COEFFICIENTS ESTIMATING THE RELATIONSHIP BETWEEN THE FOUR SUBTESTS OF THE ESSENTIAL HIGH-SCHOOL CONTENT BATTERY AND GRADE-POINT AVERAGES IN UNIVERSITIES X, Y, AND Z

Variable	University X (N = 43) r_{xy}	University Y (N = 73) r_{xy}	University Z (N = 118) r_{xy}
Mathematics Test	0.18	0.51	0.45
Science Test	0.31	0.57	0.51
Social Studies Test	0.40	0.50	0.38
English Test	0.57	0.44	0.43

Validity analysis.—In this analysis, each subtest scores were correlated with the criterion scores. This was done separately for the three schools involved. Table II gives the results. It can be seen that some of the correlation coefficients vary considerably from school to school. The results obtained in Universities Y and Z are more comparable than the ones in University X. The smallness of the sample in University X might have caused this effect. Other variations are most probably caused by differences in the

[2] *Op. cit.* p. 15.

variability of the groups, and by differences in the curricular offerings in the various schools. In any case the results demonstrate that a test's validity coefficient is subject to considerable changes

TABLE III.—PRODUCT-MOMENT CORRELATION COEFFICIENTS BETWEEN THE TERMAN-MCNEMAR TEST OF MENTAL ABILITY IQ'S AND GRADE-POINT AVERAGES EARNED IN UNIVERSITIES X, Y, AND Z

University	Correlation Coefficient	Mean IQ	SD of IQ's
University X	0.44	116.36	12.56
University Y	0.45	116.60	11.06
University Z	0.40	114.12	9.88

TABLE IV.—INTERCORRELATIONS AMONG THE FOUR SUBTESTS OF THE BATTERY AND THE TERMAN-MCNEMAR IQ'S

	Mathematics	Science	Social Studies	English	IQ's
Mathematics		0.58	0.48	0.43	0.55
Science			0.65	0.52	0.65
Social Studies				0.54	0.64
English					0.63
IQ's					

TABLE V.—BETA-WEIGHTS OF THE FIVE PREDICTOR VARIABLES COMPUTED SEPARATELY BY SCHOOLS

Test	University X	University Y	University Z
Mathematics	−.16	.24	.21
Science	−.05	.30	.32
Social Studies	.14	.16	−.01
English	.49	.14	.21
Intelligence Measure	.16	−.06	−.05

with changes in the sample, or in the composition of a complex criterion.

Since the Terman-McNemar Test of Mental Ability IQ's were available for most of the students in the experimental sample, their relationship to the grade-point averages was also examined. The results are reported in Table III. The average mental ability

(as measured by this test) of the students in University Z appears to be slightly lower and the sample seems to be slightly more homogeneous. Students in University X and University Y were practically identical with respect to average mental ability. However, the above data must be viewed as pertaining to the experimental sample only, since not all freshmen in any of the three schools were tested, and sampling biases of various kinds might have been present. The predictive power of the IQ's was only moderately high and, as will be shown later, it did not contribute to the total prediction, since the test did not seem to measure any abilities different from those measured by the Battery itself.

In order to be able to combine the measures and compute a multiple correlation coefficient, intercorrelations between the five predictor variables had to be obtained. The data given in Table IV are based on the total of two hundred thirty-four cases. An examination of this table would suggest that the degree of independence among the variables tested was such as to make it reasonable to suppose that each would contribute something to the multiple prediction. However, one must also remember that the intercorrelations are in most instances as high or higher than the validity coefficients given in Table II. Thus, the multiple R can be expected to be only moderately high and the Beta-weights for many of the variables rather low. The obtained multiple R's, are in agreement with the above consideration. They equal to 0.60, 0.63, and 0.57 for Universities X, Y, and Z, respectively.

The Beta-weights for the various predictor variables, arrived at by the Doolittle solution of the normal regression equations are given in Table V.

The reliability of the criterion variable was not investigated in this study. It is very probable that it was rather low. Thus, it can be assumed that, if the obtained r's had been corrected accordingly, the multiple prediction might have been considerably improved.

Nevertheless, it can be said that the multiple R's obtained in this study compare favorably with most R's reported in studies of a similar nature. However, one must remember that an R of 0.60 gives one only about twenty per cent improvement over pure chance prediction. There is still room for much refinement in the general field of college success prediction.

MENTAL HEALTH ANALYSIS OF SOCIALLY OVER-ACCEPTED, SOCIALLY UNDER-ACCEPTED, OVERAGE AND UNDERAGE PUPILS IN THE SIXTH GRADE

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In recent years considerable attention has been directed to the study of mental health. In fact our Federal Government has considered mental health important enough to pass a Mental Health Act. Citizens have organized local, state and national mental health associations. Unfortunately the bulk of the energy has been applied to the adult population. The present study is concerned with the school population where, in many cases, the problems of the adult are rooted. Mental health problems of children were studied by seeking answers to the following questions: Is there any relationship between mental health, overageness and underageness? Furthermore, is there any relationship between mental health, social acceptance and social rejection?

Mental health was determined by administering Thorpe, Clark and Tiegs' *Mental Health Analysis*—Elementary Series, Form A to seven hundred and forty-three sixth-grade pupils in and around Los Angeles. This paper and pencil questionnaire differs from the usual personality test in the fact that its results can be summarized into two scores: Mental Health Liabilities and Mental Health Assets. The total score is obtained by combining the two raw scores of liabilities and assets and finding the percentile rank on a chart provided for that purpose.

Mental Health Liabilities include: A) Behavioral Immaturity, B) Emotional Instability, C) Feelings of Inadequacy, D) Physical Defects and E) Nervous Manifestations. The scoring is so arranged that a high percentile rank always indicates freedom from liabilities. Mental Health Assets include: A) Close Personal Relationships, B) Inter-personal Skills, C) Social Participation, D) Satisfying Work, and Recreation and E) Adequate Outlook and Goals. A high score on this group of subtests is intended to indicate a satisfactory and desirable amount of these manifestations of the child's personality.

Underageness and overageness were determined by taking those who were nine months below or above the mean chronological age of their half-grade placement. In twelve out of twenty-two classes the underage pupils had higher Mental Health Liability mean percentile scores than their fellow students. In six of the remaining ten classes the at-age pupils achieved higher mean scores and in only four classes the overage pupils earned higher mean percentile scores. The difference between the Mental Health Liabilities mean percentile scores of the underage[1] and overage pupils was 19.9 with a critical ratio of 4.6, which is significant beyond the one per cent level of confidence. The difference between the at-age and overage pupil's mean scores was 16.7 with a critical ratio of 4.3, which is significant beyond the one per cent level. The mean difference between the underage and at-age pupils' Mental Health Liabilities mean scores was not significant.

In thirteen out of twenty-two classes the underage pupils possessed higher Mental Health Assets mean percentile scores than the at-age and overage pupils. In four of the nine remaining classes the at-age pupils make higher mean percentile scores and the overage pupils received higher mean scores in the remaining five classes. The difference between the underage and overage pupils' Mental Health Assets mean percentile scores was 16.4 with a critical ratio of 3.7, which is significant beyond the one per cent level of confidence. The mean difference of the at-age and overage pupils scores was 13.6 with a critical ratio of 3.2, which is significant beyond the one per cent level. The underage and at-age pupils' mean difference was not significant.

In thirteen out of twenty-two classes the underage pupils earned greater Mental Health total scores. The at-age pupils received the highest Mental Health total scores in seven classes and the overage pupils in but two classes. The difference between the underage and overage pupils' Mental Health total scores was 21.1 with a critical ratio of 7.2, which is significant beyond the one per cent level. The at-age and overage pupils' mean difference was 16.3 with a critical ratio of 4.5, which is significant beyond the one per cent level of confidence. The mean difference between the underage and at-age pupils' Mental Health total scores was significant at the five per cent level.

[1] In presenting the differences of means, the first mentioned is always the greater of the two. This scheme is followed throughout the study.

Again one finds the stepped relationship among the underage, at-age and overage pupils. The younger pupils seem to have better self-evaluation than the others in the class. The at-age pupils received the next best self-evaluation and the overage pupils appear to have the lowest self-evaluation.

MENTAL HEALTH OF OVER-ACCEPTED AND UNDER-ACCEPTED PUPILS

Social acceptance and social rejection were determined by a multi-criteria sociometric test. Five questions were asked in the sociometric questionnaire: (1) If you were changed to another classroom, which boy or girl from this classroom would you choose to go with you? (2) If you were changed to another classroom, which boy or girl from this class would you not choose to go with you? (3) Which boy or girl from this classroom would you choose as a team captain in a game? (4) Which boy or girl from this classroom would you choose for class president? (5) If you needed help to do your classwork, which boy or girl from this classroom would you choose?

Each pupil was allowed three choices for each question. The choices were weighted as follows: five points for a first choice, three points for a second choice, and one point for a third choice. Sociometric status was determined by the combined weighted scores of question one, three, four and five. Standard scores were computed from the raw scores using Milo Whitson's[2] dual-deviation technique adapted for sociometric data. Significance above and below the mean were also computed. Those who were roughly three standard deviations above the mean were said to be significantly over-accepted. Those who were roughly three standard deviations below the mean were said to be significantly under-accepted. Rejection scores were compiled from question number two, ranked and the four highest scores taken. In nineteen out of twenty-two classes over-accepted pupils had higher Mental Health Liabilities mean percentile scores than the under-accepted pupils. The difference between the means was 23.6 with a critical ratio of 5.5, which is significant beyond the one per cent level. Not only are the over-accepted pupils more popular than their peers but they enjoy better mental health; furthermore the under-accepted pupils are less popular and by their evaluation have poor mental health.

[2] Milo Whitson, "Statistical and Geometric Techniques for Sociometric Data." Unpublished Doctor's Dissertation, University of Southern California, Los Angeles, Calif., June, 1949. 233 pp.

In Mental Health Assets the over-accepted pupils excelled over the under-accepted pupils in all twenty-two classes. The mean percentile scores of the over-accepted pupils were larger for each class studied. The difference between the means was 28.1 with a critical ratio of 5.2, which is significant beyond the one per cent level.

Data for the Total Mental Health scores reveal the same relationship with the over-accepted pupil enjoying better mental health in twenty-one out of twenty-two classes. The under-accepted pupils had higher mean percentile scores in only one class and that by a difference in score of only .80. The difference between the means was 27.5 with a critical ratio of 7.4, which is significant beyond the one per cent level.

The pattern is clear. The over-accepted pupils are better adjusted individuals as well as being better liked by their peers. It is difficult to say if there is a cause-and-effect relationship present. Determining validity for a published personality test is outside the scope of this study, but the data are so one-sided that it is difficult to ignore the apparent correlation between a high score on the *Mental Health Analysis* test and a high score on the sociometric questionnaire. The similarity becomes even more outstanding when one considers the great differences in the two types of questionnaires.

For a more complete study of the *Mental Health Analysis* questionnaire, the mental health of the four highest 'rejectees', the four highest 'stars of attraction' and the remainder of the group were compared.

MENTAL HEALTH OF 'STARS', 'REJECTEES' AND THE REMAINDER OF THE GROUP

The 'stars of attraction' excelled over the other two groups in Mental Health Liabilities in sixteen out of twenty-two classes studied. The remainder of the group received higher scores in four classes and the 'rejectees' in two classes. The mean difference between the 'stars' and 'rejectees' Mental Health Liabilities scores was 22.6 with a critical ratio of 5.4, which is significant beyond the one per cent level. The difference between the 'stars' and the remainder of the group was 7.8 with a critical ratio of 2.5, which is almost significant at the one per cent level. The mean difference between the remainder of the group and the 'rejectees' was 14.8 with a critical ratio of 4.6, which is significant beyond the one per cent level.

The 'stars of attraction' possessed the highest mean percentile score in all but one class in Mental Health Assets. In one class the remainder of the group received the highest mean percentile score. The difference between the means of the 'stars' and 'rejectees' was 30 with a critical ratio of 8.1, which is significant beyond the one per cent level. The 'stars' and the remainder of the group had a mean difference of 13 with a critical ratio of 5.0, which is significant beyond the one per cent level. The difference between the remainder of the group and the 'rejectees' was 17 with a critical ratio of 5.7, which is significant beyond the one per cent level.

The four highest 'stars of attraction' also lead in Mental Health total scores in sixteen out of twenty-two classes. The remainder of the group received the highest mean scores in five classes and the 'rejectees' Mental Health total scores was 28.4 with a critical ratio of 7.7, which is significant beyond the one per cent level. The mean difference between the 'stars' and the remainder of the group was 10.4 with a critical ratio of 3.7, which is significant beyond the one per cent level. The Mental Health total score mean difference between the remainder of the group and the four highest 'rejectees' was 18 with a critical ratio of 6.2, which is significant beyond the one per cent level.

SUMMARY

Mental Health Analysis data of the underage, at-age and overage pupils were presented in this study. Similar data were presented for the socially over-accepted and under-accepted pupils.

1) The underage and at-age pupils earned significantly better mental health scores than the overage pupils. The mean difference between the underage and the at-age pupils was not significant. In classes twelve and seventeen, where the overage pupils enjoyed better sociometric status, they rated themselves with average mental health. On the other hand, in classes four and eleven, where the overage pupils received relatively superior sociometric status, they rated themselves above average mental health. Whether the low mental health of the overage pupils is a real difference revealed by the test scores or an accidental one because overage pupils are usually found to be poor readers and do not understand test items sufficiently well to answer the questionnaire intelligently is an hypothesis worth investigating.

2) The socially over-accepted pupils produced significantly

higher mental health scores than the under-accepted pupils. The pupils who possess superior sociometric status also have better mental health than the pupils who are ignored, unwanted and disliked by their peers.

3) The four highest 'stars of attraction', those receiving the largest number of first and second choices on the sociometric test, rated themselves significantly higher mental health scores than the four highest 'rejectees' or those who received the greatest number of rejection choices on the sociometric test. The 'stars' also appear to possess better mental health than the remainder of the class.

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THE BLOOD PICTURE IN READING FAILURES

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The observation that reading failures with anemia often improve in their school achievement without special teaching when the anemia is adequately treated, directed attention to the circulatory area. Two previous studies (*1*, *2*) showed a higher incidence of circulatory difficulties among poor readers than among non-failures or unselected pupils. A study made in connection with stuttering (*3*) (another aspect of language trouble) showed biochemical changes in the blood of stutterers. The present investigation concerns itself with hemoglobin and the blood cells.

The blood of thirty reading failures were studied as to the level of hemoglobin, the total red and white cell counts, and a differential white cell count. The results are summarized in Table I. The group ranged in age from seven through seventeen, with a median age of eleven. Eighty-three per cent of the failures were boys, approximately the usual proportion found in most language difficulty groups. The median birth weight of the group was seven and two-tenths pounds, but it was deemed significant that the first quartile point in the distribution fell at five and one-half pounds. This means that twenty-five per cent of the cases were children of premature birth, a considerably higher incidence than one meets in the general population. It tends to confirm an earlier finding that reading failures showed an incidence of premature birth (by either birth weight or time criteria) of fifteen per cent (*4*). About a third of the group exhibited hemoglobin of twelve and four-tenths grams or less, but the average and also the median hemoglobin for the whole group was thirteen grams, which falls in the normal range. The red blood cell count was not remarkable nor was the total white count.

The differential white count showed some variations though not statistically great ones. The polymorphonuclear leukocytes in both average and median for the group fell slightly below the control norm, which was the average of values for corresponding ages, taken from the work of several investigators. However, it may be significant that nearly three-quarters of the group fell below this norm when, statistically, one would expect not more than half to

do so. The lymphocytes were slightly more numerous among the reading failures and the monocytes were slightly less frequent. Somewhat more than three-quarters of the cases fell below the monocyte norm. Eosinophiles and basophiles did not deviate very much from the adult level, although the basophiles were slightly more numerous.

TABLE I. BLOOD PICTURE IN THIRTY READING FAILURES

Characteristic	Reading failures				Norms.* Av.
	Q_1	Md	Q_3	Av.	
Hemoglobin (grams)	12.3	13.0	13.8	13.0	13.5
Red cells	4,450,000	5,000,000	5,420,000	4,956,250	4,750,000
White cells	7,000	8,500	10,320	8,949	8,000
Polymorphonuclear leukocytes	51	57	64	54	62
Lymphocytes	27	36	44	34	30
Monocytes	3	6	7	5	8
Eosinophiles	2	3	5	4	—
Basophiles	0	1	2	1	—
	Frequency	degree.			
Monocytes	20%	—			0
Myeloblasts	0	—			0
Lymphoblasts	0	—			0
Platelets	10%	numerous			0
Anisocytosis	13%	moderate			0
Poikilocytosis	13%	slight			0

* Norms in terms of average. Values from a number of different reports of studies of children in the same age range as this study.

A number of cases exhibited abnormal cell forms. Myelocytes were present in twenty per cent of the cases; platelets were numerous in ten per cent; while moderate anisocytosis with the presence of poikilocytes was observed in thirteen per cent. The total number of cases presenting abnormal forms constituted twenty per cent of the distribution. The forms observed suggest a tendency toward one or another form of anemia. No myeloblasts or lymphoblasts were found in any case.

This study is limited by the small number of cases, which is due

to the fact that parents and pupils who come in for educational study and advice are not usually prepared for medical laboratory procedures. When a needle or other piece of medical equipment is mentioned or exhibited pupil-teacher rapport is promptly impaired and often destroyed. For this reason such work is avoided.

The results of this study suggest that, within the present group at least, blood cell and haemoglobin changes are not frequent enough to be of statistical importance and, as is often said in educational investigations, none of the factors involved will differentiate good from poor readers.

This implies that anemia is probably not a major cause of reading or other school subject failure. The fact, however, that more than a third of the pupils in the study showed low haemoglobin indicates the possibility that anemia may be a contributing cause in some instances. Haemoglobin is concerned with the distribution of oxygen to the tissues of the body. An optimum amount must be supplied if metabolism is to be normal. Probably the cells of the cerebral cortex are the most sensitive to oxygen deprivation. When haemoglobin is low there is not enough to supply the necessary oxygen to the tissues and certain changes occur. Among them are some degree of cortical depression, diminution of the acuity of vision and hearing, personality changes and impaired handwriting performance. Such factors can make it difficult for the pupil to apply himself sufficiently for satisfactory learning. It may be pointed out that many anemic people of all ages complain, among other things, of being tired and unable to concentrate.

The significance of the lower count of polymorphonuclear leukocytes is somewhat tempered by the fact that the count is known to be low in children. Nevertheless, the norm used is for children of the ages included in this study and this tends to demand somewhat more consideration of this factor than would be given otherwise. The presence of the various abnormal cell forms seems to this investigator to lend some added significance to anemia in the broadest sense, as one possible contributing cause of poor school achievement.

SUMMARY

Thirty reading failures were studied as to the blood picture. Certain variations in hemoglobin and cell count were found and a fifth of the cases presented abnormal cell forms. The findings are

discussed. While the changes in general are not frequent enough to be statistically significant, except for the appearance of abnormal cell forms, it is concluded that they merit attention in the individual case and that they may constitute one of many contributing causes of reading failure.

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BOOK REVIEWS

DANIEL BROWER AND LAWRENCE E. ABT, Editors. *Progress in Clinical Psychology*. New York: Grune and Stratton, 1952. Vol. 1, Section 1, pp. 328; Section 2, pp. 329–564.

The two books are presented as a single continued volume with a subject index in each book. The subjects through the two books are in seven parts: An introduction on the emergence of clinical psychology; diagnostic and evaluative procedures; psychotherapy; developmental processes; applications of clinical psychology to special areas; approaches to clinical psychology; and professional issues.

The forty-two chapters (twenty in the first book) are written by different individuals all of whom have done special work in the fields about which they write. For the most part the selection of authors has been excellent and the reports can therefore be considered as having a high degree of authority.

In planning this volume it was decided "to employ value judgments in the selection of material to be covered and in the allotment of space to the areas decided upon. We have sought, in Volume 1, to provide as complete a coverage as possible of the past six years in clinical psychology and to point up, in the process, as many stimuli as possible to further thinking and research." (p. vii). It was planned that the book should not be exhaustive nor "encyclopedically complete," but that each writer should be "as selective and constructively critical of his materials as he wished." (p. viii). It is one of a series of volumes to be issued every second or third year.

The introductory chapter by L. E. Abt gives a frank and over-all orientation in the present condition of clinical psychology, emphasizing the lack of generally acceptable principles, the dubious state of many of the principal tools of clinical psychology, lack of agreement on such problems as psychodiagnosis, diagnosis and prediction, difficulties in basic theory, the effort to integrate clinical psychology with "the larger science of psychology," and problems of psychotherapy, especially, of a research basis for psychotherapy. What is not to be forgotten is "The very youthfulness" of clinical psychology.

The content of the first book includes diagnostic and evaluative

procedures and psychotherapy. Under the first head are discussed intellective functions; measures of aptitude, achievement and interest; personal documents; self-appraisal methods; testing for psychological deficit; the Rorschach test; apperceptive methods; House-tree-person and human figure drawings; Gestalt functions; sentence completion and work association tests; picture-frustration; and the Szondi test. Under the second head are client-centered procedure; psychoanalytic theory and technique; group psychotherapy; play and related techniques; spontaneous art in therapy and diagnosis; and neurosis and its treatment as learning phenomena.

The second book deals with developmental processes: infancy; early childhood; latency period; adolescence; and gerontology;—applications of clinical psychology to eleven special areas, (eleven chapters); approaches to clinical psychology: psychosurgery, cultural anthropology; social psychology, statistical methods; and P-technique factorization;—and clinical psychology as a profession.

The discussions for the most part are very condensed; so much so that a chapter, for example, of six and a quarter pages has a bibliography of 394 references. Many of the chapters have bibliographies running from nearly one hundred to more than two hundred references. The books are therefore especially valuable for reference.

The discussions assume a very considerable fundamental knowledge of the subject. The books do not attempt to give the fundamentals but explicitly state that they are concerned with the progress of the subject since World War 2.

Besides the bibliographies, the especial value of the books lies in the mature judgment of most of the writers who were chosen for their special knowledge and experience.

If there appear to be defects of balance in the contents and amounts of space given to different subjects, it is to be remembered that there were differences in the amounts of progress in the various fields of a new and fast developing discipline. It is too early to evaluate progress in the field, but these and later volumes which are promised may well provide material that will assist in such a valuation and which will point out holes in development that will attract research students to investigation that is most needed. Well may these books help emphasize how much we have not accomplished, as for example, in understanding, and, if possible, more

agreement, in the problems of diagnosis and of psychotherapy. One might expect that some reference would have been made to the extensive work that has been done on professional ethics. Georgia has not certification but licensing. More detailed indexes would have added to the value of the books. The term diagnosis does not appear in either index.

In this field where there is great need for satisfactory texts these books are most welcome, but for students without a very considerable foundation, they will be found to be difficult and not wholly effective as texts.

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Samuel J. Beck. *Rorschach's Test II—Advances in Interpretation.* New York: Grune & Stratton, 1952, pp. 301. $5.50.

In this volume, as in his earlier two, Dr. Beck continues his exhaustive analysis of the Rorschach Test and its ever widening compass. Like the first two volumes, it is characterized by a scholarship and a literary flavor that has come to be associated with Beck's writings; even more than the first two, it will serve the experienced Rorschacher rather than the beginner.

Rorschach's Test III is composed of three main sections. The first, and shortest, is a defense of the holistic concept of personality in which Beck seeks to combine the points of view of Huglings Jackson, Freud, Lewin and the Gestalt school, with special emphasis on Jackson's concept of levels of functioning. Beck rejects in particular Allport's principle of independent traits and the view that the continuity of the individual is historic rather than functional. This uncompromising holism is not implicit in Rorschach's original approach (Beck would disagree), but it is necessary to support Beck's conviction that the entire personality is describable by the symbols of the Rorschach Test and its quantitative ratios. This may represent the experience of psychologists whose test armamentarium is restricted to the Rorschach, but the claim would be widely questioned by clinicians using other instruments along with the Rorschach in evaluating personality. There is no test so good but that another one may be more revealing at different times or for different individuals. Human personality is too complex to project itself in its totality on a single surface.

The second section, entitled "Advances in Interpretation," comprises not so much new material as further exploration and reinterpretation of the conventional Rorschach symbols. Of particular interest is Beck's discussion of the Rorschach elements which are claimed to reveal ego-strength, ego-insufficiences, and ego-defenses. The items particularly emphasized are the F+ %, the amount of W and Z, the sequence and approach, and interestingly enough, the P %—the determinants which Beck associates with intellectual productivity in contrast to those which deal with manifestations of emotion (C, Y, V, M). He regards P as a special and most concentrated form of the F+ response. According to Beck, a subject's P per cent indicates not only closeness of identification with the norm setting group but reflects further the degree of the subject's ability to integrate successfully. Also re-evaluated are the various affective determinants of the Rorschach, and in particular the M response to which Beck has always attached great significance. He is interested especially in M as a measure of energy, that is, the amount of energy invested by the patient in the M associations. In this connection Beck tried out the Levy Movement Scale and applied its scoring scheme to the movement responses on the Rorschach. His aim was to get some indication of how strongly the patients felt the indicated fantasies, but he was unable to get any definitive answer from the clinical material. Altogether this chapter will be found to be very provocative but, although reference is made to studies either in progress or about to be published, few factual data are presented.

In the third, and by far the longest section, Beck devotes over two hundred pages to detailed analyses of seven Rorschach protocols obtained from four patients, three of whom were tested before and again after therapy of varying duration. In these analyses Beck gives renewed evidence as to why he is estimated by many as one of the leading, if not the leading, Rorschacher in the country. To be able to write forty pages on a single protocol involving some thirty responses is in itself *tour de force*; to be able to do so and be convincing would be a greater achievement. In this respect Beck is only partially successful. The reports are much too long for even an initiated Rorschacher to follow. They are made additionally difficult by Beck's penchant for metaphor and analogy. The net result is that what he has to say is very interesting at any given

point but far from clear when taken as a whole; nor do the summaries at the end of each case help much to clarify the total picture. As always, Beck's case presentations are profitable reading, but one hopes that in his next publication he will be a little less literary and more succinct.

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DAEL WOLFLE, CLAUDE E. BUXTON, CHARLES N. COFER, JOHN W. GUSTAD, ROBERT B. MACLEOD, AND WILBERT J. MCKEACHIE. *Improving Undergraduate Instruction in Psychology*. New Pork: The Macmillan Company, 1952, pp. 60. $1.25.

As the authors state, an occasional review of what is being taught in a field is required to improve teaching a particular subject matter. The 'reviewing' was done by the authors at a summer conference. To many readers the results of their conferring will not only be found disappointing, but also will appear to be a backward rather than a forward step in teaching undergraduate psychology. Apparently their view is that undergraudate psychology is for the chosen few who may be interested and able to profit by a systematic presentation of scientific content in a narrow, systematic theoretical framework. No consideration is to be given to adjustment problems or materials related to contemporary life affairs. If student enrollment drops off markedly, so much the better. Staff members without courses to teach, they state, can be absorbed by laboratories.

The six chapters deal with objectives, recommended curriculum, personal adjustment courses, technical training, implementation of the curriculum, and research problems. In general, the viewpoint taken by the authors will seem to many to be narrow, one-sided and inadequate. There should be satisfactory alternatives to the program of the authors. In fact there are such programs already in existence and they are highly successful.

Finally, one may note that the title of this book is misleading. It deals mainly with programs of offerings and content of courses. Only incidentally is note made of instruction. Actually the contents of the volume might be described as a program of psychology for the psychologist rather than psychology for students.

University of Minnesota MILES A. TINKER

ARTHUR E. TRAXLER, ROBERT JACOBS, MARGARET SELOVER AND AGATHA TOWNSEND. *Intoduction To Testing and the Use of Test Results in Public Schools* New York: Harper and Brothers, 1953, pp. 113.

The increasing large scale use of objective tests by public school systems throughout this country has created a demand for a simplified but relatively complete handbook on the fundamentals of educational testing. The work of Traxler, et al is an attempt to meet this need. It is written in a way that any teacher, despite his lack of knowledge of statistics or psychometrics, can readily grasp the basic concepts which are presented and which are a fair sample of those prerequisite to any intelligent use of current measuring devices in the classroom.

The book is intensely practical in its orientation, and it seems apparent that the authors have had firsthand experience with classroom teachers of many types. The principles of selecting, administering, scoring, analyzing, recording and using test results which are presented are undoubtedly sound, and the brevity, clarity, and conciseness with which they are presented will appeal to the busy educator already overloaded with a full teaching or administrative schedule. The final chapter in the book particularly will find hearty acceptance even among teachers who are generally familiar with the contents of the preceding nine chapters. Here is presented the case history of an incoming student along with a detailed account of what tests were given him and when, why these particular tests were selected, how the scores were interpreted and used, and what the end-result of the program was upon his graduation.

This reviewer, however, believes that the naïve reader should be made aware of the fact that the book represents a somewhat narrow philosophy of educational measurement. Tests are conceived of as tools which the teacher can employ as aids to guide the learning experiences of students. Practically no reference is made to the fact that tests can serve other equally worthy purposes. The use of measurement as an active rather than a passive agent in the learning process receives no emphasis. The use of measurement as a powerful method for inducing and directing curriculum change is barely touched upon. The notion that students, as well as teachers, might profitably have some hand in the selection of the tests which are to be used for their own guidance, is entirely absent.

Although such criticisms may seem of relatively minor importance, there is some danger that users will fail to realize the fact that the book presents only one of the important points of view about educational tests and their uses. For this particular point of view, the book is quite good and will undoubtedly find wide acceptance among persons not intimately acquainted with tests.

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JAMES DEESE. *The Psychology of Learning*. New York: McGraw-Hill Book Company, 1952, pp. 398. $5.50.

This undergraduate text, with an emphasis upon experimental evidence rather than upon theoretical points of view, is intended to provide a representative picture of the psychology of learning. The various chapters cover the important topics in the field. Special stress is placed upon recent literature.

The author states that "the subject matter of this book is the behavior of organisms." It is behavioristic "chiefly in the sense that it emphasizes observable animal or human behavior." It is intended that the theoretical framework of the book have wide application. To achieve this a great many examples of learning are covered with a relatively economical set of principles and concepts. The assumption is made that much of behavior, whether animal or human, is made of the same stuff. However, although many examples of learning are based upon rat behavior, the ultimate interest is in man.

This text is concerned with basic factors and principles in learning behavior. Included are various sections dealing with reinforcement, complex learning, retention, transfer, efficiency, problem-solving, nature of learner, conflict, physiological problems, and theory.

Instructors who are looking for an applied psychology of learning will not be interested in this text. But those who wish a brief straight-forward discussion of fundamentals will find that this book fits. Furthermore it is clearly written, well organized, and well documented.

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